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### FOREWORD

This document establishes performance and design requirements for the IDAMST Operational Flight Program Applications Software.

It was prepared for the Air Force Avionics Laboratory under Contract Number F33615-76-C-1099, in fulfillment of Contract Data Requirement List item 0001, sequence number 7.

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### TABLE OF CONTENTS

Section	<u>Title</u>	Page
	Foreword Table of Contents List of Figures List of Tables Abbreviations	ii iii vi vii viii
1.0 1.1 1.2	SCOPE Identification Functional Summary	1 1 1
2.0 2.1	APPLICABLE DOCUMENTS Government Documents .	2 2
3.0 3.1 3.1.1 3.1.1.1 3.1.1.2 3.1.1.2.1 3.1.1.2.2 3.1.1.2.2.1 3.1.1.2.2.2 3.1.1.2.2.3 3.1.1.2.2.4 3.1.1.2.2.5 3.1.1.2.2.6	REQUIREMENTS Computer Program Definition Interface Requirements Interface Block Diagram Detailed Interface Definition IDAMST System Hardware Interfaces Function Identification Flight and Propulsion Communication Navigation and Guidance Payload Aircraft Systems Defense	3 3 3 7 7 7 7 7 20 20 24 27 30
3.1.1.2.3 3.1.1.2.3.1	Software Interfaces Executive Software Interface	30 31
3.1.2 3.1.2.1 3.1.2.2	Applications Software Architecture Software Structure Software Relationships	41 41 55
3.2 3.2.1 3.2.1.1 3.2.1.2 3.2.1.3 3.2.1.4 3.2.2 3.2.3 3.2.3.1	Detailed Functional Requirements System Control Modules Master Sequencer Request Processor Configurator Subsystem Status Monitor Operational Sequencers Specialist Functions Brute Force Specialist Functions	62 62 62 64 65 66 67

# TABLE OF CONTENTS (Continued)

<u>Section</u>	<u>Title</u>	Page
3.2.3.3	Tailored Mode Specialist Functions	79
3.2.3.4 3.2.4 3.2.4.1 3.2.4.2 3.2.4.3 3.2.4.4	Handler Specialist Functions Display Processes Lights Display Process Instruments Display Process HUD Display Process HSD Display Process	87 90 90 91 91 92
3.2.4.5 3.2.4.6 3.2.4.7 3.2.4.8 3.2.4.9 3.2.4.10	MPD Checklist Display Process MPD Parameters/Status Display Process Error/Warning Display Process IMK Fixed Text Display Process DEK Mark Display Process IMK Status Display Process	94 95 95 99 99
3.2.5 3.2.5.1 3.2.5.2 3.2.5.3 3.2.5.4 3.2.5.5 3.2.5.7 3.2.5.8 3.2.5.9 3.2.5.10 3.2.5.11 3.2.5.12 3.2.5.13 3.2.5.14 3.2.5.15 3.2.5.16 3.2.5.17 3.2.5.16 3.2.5.17 3.2.5.18 3.2.5.19	Equipment Processes  UHF-AM Equipment Process VHF-FM Equipment Process HF/SSB Equipment Process ICS Equipment Process Public Address Equipment Process Secure Voice Equipment Process DEK Equipment Process DEK Equipment Process TACAN Equipment Process HCU Equipment Process OMEGA Equipment Process CCA Equipment Process Flight Control System Equipment Process Flares Dispenser System Equipment Process G-Meter Equipment Process INS Equipment Process LF ADF Equipment Process UHF ADF Equipment Process Radar Altimeter Equipment Process	103 103 105 106 107 108 109 110 111 112 113 114 116 118 118 119 120 121 122
3.2.5.22 3.2.5.23 3.2.5.24 2.2.5.25 3.2.5.26 3.2.5.27 3.2.5.28 3.2.5.29	ILS Equipment Process Compass Equipment Process Long Range Radar Equipment Process IRD & W System Equipment Process RHAW System Equipment Process Flight Surfaces Equipment Process Aircraft Sensors Equipment Process Brakes/Gear/Caution Equipment Process	126 127 128 129 129 130 130
5.2.5 30	Avianics On/Off Fauinment Process	132

# TABLE OF CONTENTS (Continued)

Section	Title	Page
3.2.5.31	FDR Equipment Process	133
3.2.6	Special Requirements	134
3.3 3.3.1 3.3.2 3.3.3	Adaptation General Environment System Parameters System Capacities	135 135 135 135
4.0 4.1 4.2 4.2.1 4.2.2 4.2.3	Quality Assurance Provisions Introduction Computer Program Verification Program Element Tests CPCI Integration Tests Formal Software Testing	138 138 139 139 140
5.0	Preparation for Delivery	141
6.0 6.1 6.1.1 6.1.2 6.1.3	Notes Growth Items JTIDS TF/TA GPS	142 142 142 145 146
10.0	Appendix I: Hardware/Software Signal List	147

## LIST OF FIGURES

Number	Title	Page
3.0-1	IDAMST Composite Mission Requirements	4
3.1-1	IDAMST OFP Interfaces	5
3.1-2	IDAMST System Block Diagram	6
3.1-3	IDAMST Signal List for Applications Software/Example	9
3.1-4	IDAMST Function Identification List	10
3.1-5	IDAMST Cockpit Instrument Panel	12
3.1-6	IMK-DEK-HCM	15
3.1-7	Avionics - Flight Control System Interface	19
3.1-8	Communication Equipment Control Requirements	21
3.1-9	INS Block Diagram	22
3.1-10	Navigation Control Requirements	25
3.1-11	Task States and Control	32
3.1-12	Application Software Organization	42
3.1-13	Master Sequencer Interface	43
3.1-14	Request Processor Interface	44
3.1-15	Configurator Interface	45
3, 1-16	Subsystem Status Monitor Interface	46
3.1-17	Operational Sequencer Interface	47
3.1-18	Computational Specialist Function Interface	49
3.1-19	Brute Force Specialist Function Interface	50
3.1-20	Tailored Mode Specialist Function Interface	51
- 4	Handler Specialist Function Interface	52
	Display Processes Interface	53
3. 1-25	Equipment Processes Interface	54
3.1-24	Applications Software Control/Data Interfaces	56
3,7-1	Applications Software Components	63
, ,	IMK (UHF-AM) Software Function	80
5.2-3	MFDD Software Function	83
3.2-4	CCA (Pushbutton) Software Function	85
.2-5	HCH Software Function	86
) = <u></u>	Sample MPD Display Combined NAV/COMM Status	98
. 2-7	Sample IMK Fixed - Text Display	100
`-3	Sample IMK Status Display	102
	Escaling 1998 Truncian + / Dagging Functions	1/12

# LIST OF TABLES

Number	<u>Title</u>	<u>Page</u>
3. 1-1 3. 1-2	Display Parameters Categories of Compool Blocks	13 36
3.2-1	HUD Parameters	93
3.2-2 3.2-3 3.2-4	Nominal Display vs. MPD Assignment Normal Displays at Beginning of Mode EOUIP Summary	96 97 104
3.3-1	IDAMST Storage/Timing Estimates	136

### **ABBREVIATIONS**

Air Data Computer ADC Automatic Direction Finder ADF Air Force Avionics Laboratory **AFAL** Advanced Medium STOL Transport **AMST** Bus Controller Interface Unit BCIU Computed Air Release Point CARP Column Control Assembly CCA Continually Computed Impact Point CCIP Combat Control Team CCT CRT Cathode Ray Tube Digital Avionics Information System DAIS Data Entry Keyboard DEK DITS Digital Integrated Test System DS/MU Display Switch/Memory Unit Electronic Counter Measure E CM Electronic Flight Control System **EFCS** Error Handling and Recovery Software **EHARS** Flight Control System FCS Greenwich Mean Time GMT Integrated Digital Avionics for a Medium STOL Transport IDAMST Identification Friend or Foe/Selective Identification Feature IFF/SIF Instrument Landing System ILS Hand-Controller Unit HCU High Frequency/Single Side Band HT/SSB Horizontal Situation Display HSD Head-Up Display HUD Integrated Multifunction Keyboard IMK Inertial Navigation System INS

Modular Digital Scan Converter

Low Altitude Parachute Extraction System

Master Caution Light

LAPES

MCL

MOSC

MFDC Multi-Function Display Controls

MMK Master Mode Keyboard

MMU Mass Memory Unit

MPD Multi-Purpose Display

MPDG Modular Programmable Display Generator
OFP Operational Flight Program (Software)

OPS Operational Sequencer

RF Radio Frequency

RTU Remote Terminal Unit SCP Sensor Control Panel

SKE Station Keeping Equipment
STOL Short Take-Off and Landing
TACAN Tactical Air Navigation

TM Tailored Mode
T/R Transmit/Receive

T/R+G Transmit/Receive Plus Guard

UHF Ultra High Frequency
VHF Very High Frequency
VLF Very Low Frequency

ZM Zone Marker

#### 1.0 SCOPE

#### 1.1 IDENTIFICATION

This part of this specification establishes the requirements for performance, design, test, and qualification of a computer program identified as IDAMST Operational Flight Program Applications Software.

#### 1.2 FUNCTIONAL SUMMARY

→ This document specifies the software functional requirements for the AMST Mission Scenario, defined in Reference 2.1.1(a), Appendix A. Applications Software functions consist of providing the calculation and control capability necessary for the following mission/operations task areas:

- o Flight and Propulsion,
- **o** Communications
- d Navigation and Guidance,
- d Payload
- d Aircraft Systems
- Defense.

Section 2.0 contains a list of government/non-government documents which continuous to this specification.

Section 3.0 describes the design and structure of the Applications Software, and details the hardware/software interface and functional requirements.

Section 4.0 contains procedures to test and verify the Applications Software.

Section 5.0 (Preparation and Delivery) is not applicable.

Section 6.0 contains a description of identified growth areas: JTIDS, TF/TA, 605.

Section 10.0 contains a complete IDAMST signal list.

- 2.0 Applicable Documents
- 2.1 Government Documents
- 2.1.1 Appendices to Contract F33615-76-C-1099 Statement of Work (SOW).
  - (a) Appendix A "AMST Mission Profile and Scenario (updated)".
  - (b) Appendix C "System Architecture".
  - (c) Appendix E "DAIS Mission Software, OFP Applications (SA-201-303)", 17 Jan 75.
  - (d) Appendix F "DAIS Mission Software, Executive (SA-201-320)", 26 Dec 75.
  - (e) Appendix H "Software Management Plan".
  - (f) Appendix M "TRW System Backup and Recovery Strategy (TRW 6404-5-6-06)", Sept 75.
- 2.1.2 DAIS Documents (Reference)
- 2.1.2.1 ICD Mission Operation Sequence

Pilot/Controls and Displays/Interface with Application Software (SA-803-200), 15 March 76.

- 2.1.2.2 Mission Software/Controls and Displays Interface (SA-802-301), 12 March 76.
- 2.1.2.3 DAIS System Control Procedures, (SA-100-101 Appendix A), 7 Nov 75.
- 2.1.3 IDAMST Documents (Program generated).
- 2.1.3.1 Computer Program Development Specification, IDAMST OFP Executive (SB 4041), July 76.
- 2.1.3.2 Computer Program Development Specification, IDAMST OFP Error Handling and Recovery (SB 4043) July 76.
- 2.1.4 IDAMST Documents (Reference)

The following documents, because of release dates, serve only as reference documentation for this specification; however, are considered prime to further definition of the IDAMST system design.

- 2.1.4.1 System Specification for IDAMST, Type A (S1-1010), June 76.
- 2.1.4.2 Prime Item Development Specification, IDAMST Processor, Type B1 (S1-4030), June 76.
- 2.1.4.3 System Segment Specification, IDAMST Control/Display Subsystem, Type A (S1-5020), June 76.

### 3.0 REQUIREMENTS

This section contains interface and functional requirements for the IDAMST OFP Applications Software.

The AMST mission defined in Reference 2.1.1, Appendix A "AMST Mission Profile and Scenario" requires avionics software support in the areas of flight and propulsion, communications, navigation and guidance, payload, aircraft systems, and defense. The Applications Software provides the support necessary to satisfy the design and performance requirements for these mission areas. These support functions include:

- o C&D control
- o Sensor control
- o Specialized calculations (e.g., navigation, CARP)
- o Equipment health monitoring
- o Status maintenance
- o Mission mode control
- o Limited software reconfiguration

An overview scenamio of the AMST mission is shown in Figure 3.0-1.

#### 3.1 COMPUTER PROGRAM DEFINITION

#### 3.1.1 Interface Requirements

This section describes interface requirements imposed on the Applications Software design by other IDAMST equipment/computer programs.

Figure 3.1-1 identifies the three computer program configuration items comprising the OFP software subsystem for IDAMST. The Applications Software functionally interfaces with the AMST hardware subsystems integrated into IDAMST. This functional interface is shown by dashed lines on Figure 3.1-1 as a part of the OFF Executive Software. Overall control of interface operations is provided by the Executive.

The basic IDAMST software design and core element hardware design (provessors, data has remote terminals and control/displays core elements) are influenced by the Digital Avionics Information System (DAIS) design currently being developed by the Air Force Avionics Laboratory (AFAL). This is evidenced by specific architectural design requirements stated in this specification (Section 5.1.2). Also imposed on the OFP software as design considerations are some lines and techniques for structured software design as noted in Sections and 10 of Reference 2.1.1, Appendix H "Software Management Plan".

The role and characteristics of the IDAMST core element hardware effecting the effections software design are defined in Reference 2.1.1. Appendix Collistem Architecture".

### 1.1 ... Interface Block Diagram

Figure 3.1-2 is a block diagram of the IDAMST system. Three mission processors are employed in which the OFP Applications Software resides in support of the AMST mission. Overall system control is directed by the Executive Software,

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Figure 3.0-1 IDAMST Composite Mission Requirements

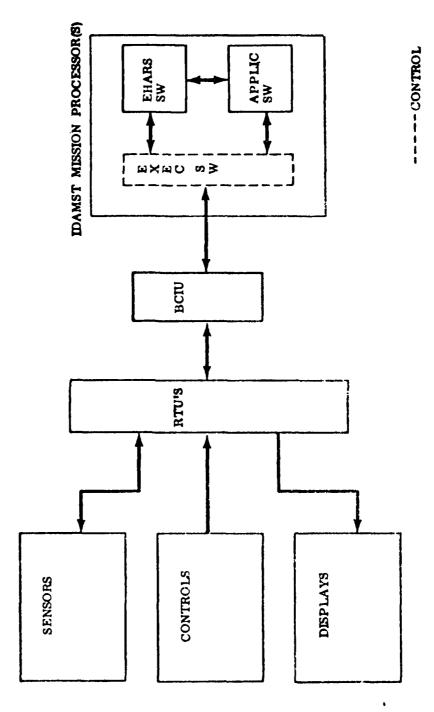


FIGURE 3.1-1 IDAMST OFP INTERFACES

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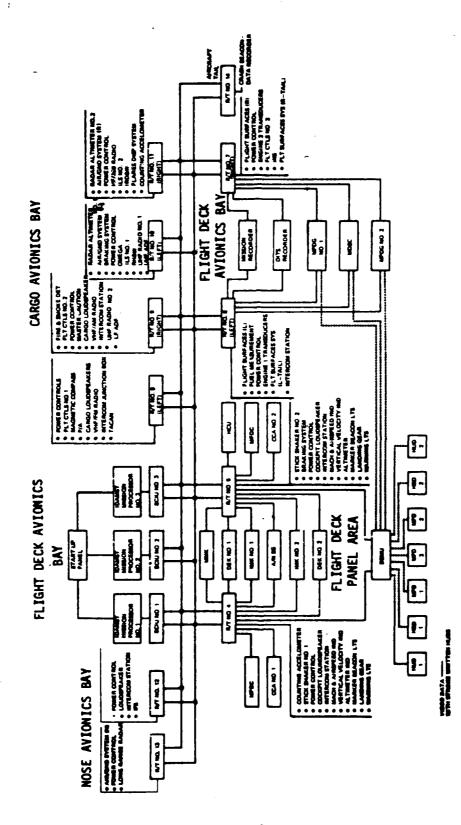


FIGURE 3.1.2: IDAMST SYSTEM BLOCK DIAGRAM

including control of the functional interfaces between the Applications Software and the IDAMST system hardware. The task of the Executive with respect to these hardware/software interfaces is to make the mechanization of data transfer transparent to the Applications Software and thereby decouple the system core element hardware programming considerations from the purely functional Applications Software tasks. To the Applications Software, the task of communicating with IDAMST system hardware is essentially the formatting, ordering, and generation or interpretation of avionics hardware parameter (signal) lists.

### 3.1.1.2 Detailed Interface Definition

The intent of this paragraph and subparagraphs is to define the functional relationships of the Applications Software to the IDAMST system hardware and associated OFP software (Executive and EHARS).

### 3.1.1.2.1 IDAMST System Hardware Interfaces

Figure 3.1-2 illustrated the IDAMST system hardware in block diagram form. Figure 3.1-2.1 is the complete IDAMST equipment/disposition list.

The Executive software is tasked with the responsibility of making the mechanish and frequency of communication transparent to the Applications Software. Programming considerations imposed by the core element design are not apparent to the Applications Software. Therefore the Applications Software/hardware interfaces can be described by a signal list. Figure 3.1-3 is an example of such a list which is required to define the functional interface to the avionics her ware. The Application Software/IDAMST Hardware interface shall be as listed in Section 10.

#### 3.1.1.2.2 Function Identification

Figure 3.1-4 identifies the selected functions for IDAMST requiring Applications Software support. These functions are categorized into six basic mission/operations task areas:

- o Flight and Propulsion
- o Communications
- o Navigation and Guidance
- o Payload
- Aircraft Systems
- o Defense

### 3.1.1.2.2.1 Flight and Propulsion

Inc 10A:ST functions in this category are those associated with pilot/copilot control and management of the AMST flight. Five subcategories are identified:

- Crew Displays
- o Crew Controls
- o Flight Control System
- o Weights and Balance
- o Energy Management

COMMICATION SYSTEMS ANIONICS AVIONICS AVIONICS	THE PROPERTY AND STREET, STREE		CONTROLS & DISPLAYS CONTROLS & DISPLAYS		PARTY TO A			The Control of the Party of the					Barrier of the state of the sta	EACHINGAIL WIRITEMENSURES SYSTEMS	AVIONICS	_	111 VO 100 PT	AVIONICS	1	CONTROL & DISPLAYS		
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FIGURE 3.1-2.1

2 5 5	IL CRITAL	SIANIC	LICHTIAL LAVICATION SYSTE-		TURNI.				
SISMAL MARE	31918	3411	SIGIO TTHE VOLTAGE RANGE	PARAMETER RANGE	SCALE FACTOR	RESOLUTION	MAUG	A/3	8/8
MEADS UP DISPL IN 1 25015	25615	9					208	~	*16
PAG HEADING BAC	25029	~	+28 VDC		28VDC=TRUE			•	•
RAME TO DEST UNITS	25023	•		6/0		1/2 MILE MR	=	•	36
RAUGE TO 3557 TEVS 25024	25024	•		06/0			*	•	36
RANGE TO DEST HERRS	25025	•		0/4/0			=	•	36
DEST SEL BERRIGG	25026	•		0/360 066	10E6=10E6	<b>3</b> DE6	=	•	36
MAG HEADTAR	25027	•		0/360 DEG	10E6=10E6	5 056	=	•	36
ATTITUDE 6000	25022	-	A/C+28 VDC		28VDC=TRUE		-	•	•
HEADT:16/54T	26002 110	.10					35	16	\$15
STEEMING ERGOR	25030	'n		10 DE6	150 UA/10 DEG	1/16 DISP	=	25	352
ROLL	25018	•		930 050	10E6=1DE6	0.1 DEG RMS	=	32	
P11CH	25021	•		+-90 DEG	1066=1066	0.1 DEG R4S	=	3	969

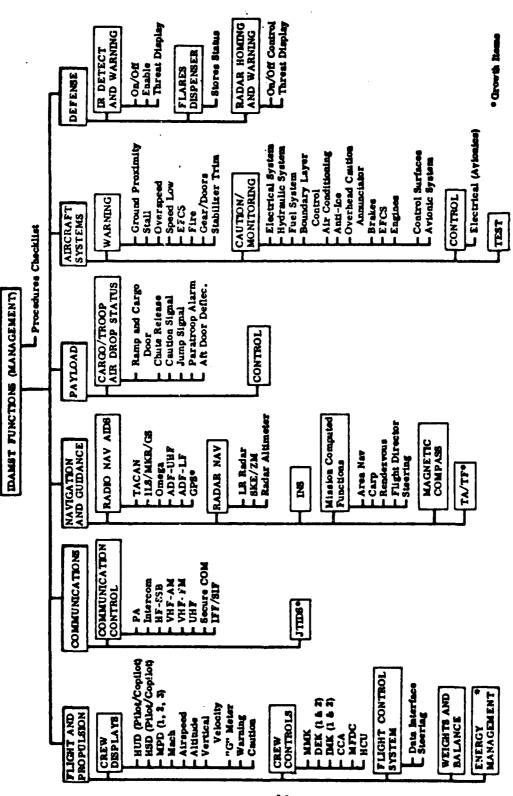


FIGURE 3.1-4 IDAMST FUNCTION IDENTIFICATION LIST

Figure 3.1-5 is a cockpit layout of the controls and displays integrated into the IDAMST system.

### 3.1.1.2.2.1.1 Crew Displays

The Application Software shall transfer formatted parameter lists and control commands to the various IDAMST display devices. These devices are divided into two categories:

- o CRT displays
- o Dedicated displays

### CRT Displays

CRT-type displays integrated into the IDAMST system are:

- o HUD (pilot's, co-pilot's)
- o HSD (pilot's, co-pilot's)
- o MPD (pilot's, co-pilot's, center)
- o IMK (pilot's, co-pilot's)

Functionally the interface between the HUD, HSD, MPD displays and the Applications Software shall be a list of ordered parameters and control data transmitted to the Modular Programmable Display Generator (MPDG). Display formatting and symbol generation is the task of the MPDG. Table 3.1-1 lists the parameters and types of information to be displayed on the HUD, HSD, and MPD.

The interface between the IMK CRT and the Applications Software shall be control and page identification transmitted to the Alpha/Numeric Symbol Generator.

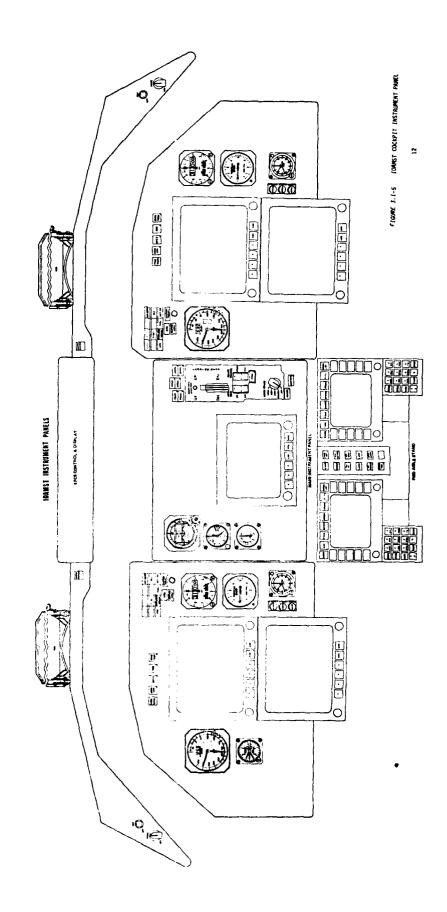
### Dedicated Displays

following displays shall be controlled by the Applications Software.

- o Mach
- o Airspeed
- o Altitude
- Ventical Velocity
- o 'G' Meter
- Warning Lights

EFCS Speed Low Ground Proximity Warning

o Marker Beacon Lights



HS: DISPLAY

Heading & Heading

ime to Go

Attitude (Pitch & Roll)

HUD FUNCTIONS (VSD ALTERNATE)

Annunciator

Selected Heading Selected Course

Flight Director Command Flight Path Angle Flight Path Acceleration

Altitude (BARO) Altitude (Radar)

Air Speed

Heading

o - From Deviation

Pointer

Localizer & GS Deviation

Speed Error

Warnings Pitch Reference

Vertical Velocity

Driřt Angle

Checklist

Airport/Target Location Projected A/C Position Alternate Track Key Elevations "Killer" Data May Points MAP Scale Navaids Distance to Waypoint Bearing Pointers (2) Bearing Identifiers

(Cursor Position)

Marning/Caution Info. Departure Area Data ake-off Parameters

system Status Comm. Status Nav. Status

Refuel Status Air Drop Flight Parameters

**Cruise Parameters** 

fertical Track Change Alert ateral Track Change Alert /ertical Deviation Path Offset Annunciator

Nav. Mode Annunciator Wavigation Warn Heading Warn

Weight and Balance Data (Gross Weight & Total Fuel) Air Drop Area Data anding Area Data Flare Inventory Approach Data Radar Display SKE Display

Engine Parameters (Cursor Position)

> Constantly Computer Impact Point alí Line

arget Designator Command Altitude Command Airspeed

Command Heading

(Cursor)

DISPLAY PARAMETERS

13

Mach

Rate of Turn

Sideslip

### 3.1.1.2.2.1.2 Crew Controls

The controls shown on Figures 3.1-5 and 3.1-6 are as follows:

- o Integrated Multifunction Keyboard IMK (pilot's, co-pilot's)
- o Data Entry Keyboard DEK (pilot's, co-pilot's)
- o Column Control Assembly CCA (pilot's, co-pilot's)
- Multifunction Display Controls MFDC (pilot's HSD and MPD, co-pilot's HSD and MPD, center MPD)
- o Hand Controller Unit HCU
- o Master Mode Keyboard MMK

The Applications Software shall accept input from these devices, and after processing display requested information and/or acknowledge receipt of control action.

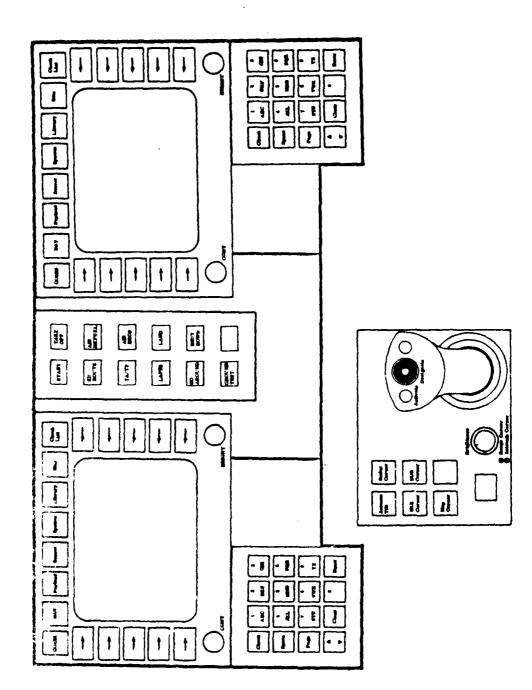


FIGURE 3.1-6 IMK-DEK-HCU

### Integrated Multifunction Keyboard (IMK)

The two IMKs (pilot's and co-pilot's) are the primary crew control devices. The IMK (Figure 3.1-6) consists of two sets of keys and a CRT. There are eight keys across the top of the IMK. These top keys allow the crew to select special functions that do not normally occur during a current mission phase. These functions are:

- o Communications used to control the radio equipment
- o Navigation used to control the navigation equipment and steering modes.
- Sensors provides sensor mode control.
- o Systems provides the crew with various system functions.
- Library allows the crew to activate several special function that do not fit into other functional areas.
- Checklist enables the crew to request MPD checklists.
- Payload provides control for loading and dropping of cargo.
- o DITS provides access to test system.

The functions implied by the ten IMK side keys depend upon the current state of the IMK. Each side key has a corresponding legend on the IMK CRT which indicates the current meaning of the key. There are one or more IMK pages for each mission phase and for each special function invoked by one of the eight IMK top keys.

The eight IMK top keys are backlighted green (active) or yellow (inactive). The ten side keys are backlighted white.

The IMK CRT was discussed as a display device in Section 3.1.1.2.2.1.1.

### Data Entry Keyboard (DEK)

The two  $\widehat{\text{DEKs}}$  (pilot's and co-pilot's) provide data entry capability and allow crew to perform MPD checklist functions.

The DEK (Figure 3.1-6) consists of 16 pushbuttons used as follows:

- o Data Entry
  - . digits O through 9
  - . CASE : upper/lower case
  - . ENTER : indicating end of data to software
  - . CLEAR: indicating restart to software
- o Checklist
  - . CHECK : check off item
  - . SPACE : skip item
  - . PAGE : advance page

The identification of each key depressed is sent (one at a time) to the Applications Software and shall be processed upon receipt of an ENTER.

### Column Control Assembly (CCA)

The two CCAs (pilot's and co-pilot's) allow microphone control by crew members. Shaker commands to the CCAs shall be generated by the Application Software whenever a stall condition becomes imminent.

### Multi-Function Display Controls (MFDC)

The MFDC consists of the six pushbuttons functionally attached to each MPD/HSD device. These pushbuttons are used by the crew to:

- o Switch a display from one device to another.
- o Request sub-types of a display.
- o Vary the display scale.
- o Request sensor video.
- o Etc.

The selected pushbutton(s) are backlighted.

### Hand Controller Unit (HCU)

The HCU is used for: 1) navigation data entry and 2) radar antenna control. Figure 3.1-6 shows its layout.

HCU control consists of:

- Seven pushbuttons allowing selection of the CRT where cursor is applicable.
- o A hand control to move cursor.
- A button on the hand control which activates output of cursor displacement (1st push) and terminates or designates to software the final cursor position (2nd push).

The pushbuttons are backlighted green (active) or white (inactive).

### Master Mode Keyboard (MMK)

The MMK (Figure 3.1-6 ) allows crew members to select high-level mission modes. These modes determine the parameters to be displayed and the control capability to be offered by the Application Software. Only one Master Mode can be active at any time.

MMK pushbuttons are backlighted green (active) or yellow (inactive).

### The Master Modes are:

START Includes flight crew preflight
TAKEOFF Taxi, takeoff, area departure
ENROUTE Later climb, cruise, early descent
AIR REFUEL Rendeqvous, acquisition, refuel
TF/TA Terrain Following/Terrain Avoidance
AIR DROP All except LAPES

LAPES
LAND Approach, land, taxi
GO AROUND
SHUTDOWN Includes flight crew post flight
GROUND TEST Ground crew preflight and postflight

#### 3.1.1.2.2.1.3 Flight Control System

The Flight Control System is assumed to be flight critical; therefore it was mechanized in a triplex configuration. The air data and aircraft attitude information is required for flight control and assumed to be available for use by the avionics. In addition, the avionics system shall provide steering signals to the flight control system and monitor the flight control status.

The IDAMST - Flight Control System interface is shown in Figure 3.1-7.

### 3.1.1.2.2.1.4 Weights and Balance

A simple weight and balance function is assumed, whereby aircraft gross weight, total fuel, and calculated center of gravity (c.g.) is displayed via an MPD. The crew must input aircraft gross weight and c.g. position prior to takeoff and decremented weight and c.g. shift after cargo drop. The mission processors will maintain current estimated gross weight and c.g. position prior to takeoff and decremented weight and c.g. shift after cargo drop. The mission processors will maintain current estimated gross weight and c.g. position throughout the flight, based upon crew inputs, remaining fuel, and fuel distribution. Cargo weight decrements and c.g. shifts may be pre-stored and only the drop event need be signalled to the processors via the IMK.

#### 3.1.1.2.2.1.5 Fnergy Management

Engine performance and airplane operations can be optimized by energy management technique. Energy management has been noted only as a potential growth item.

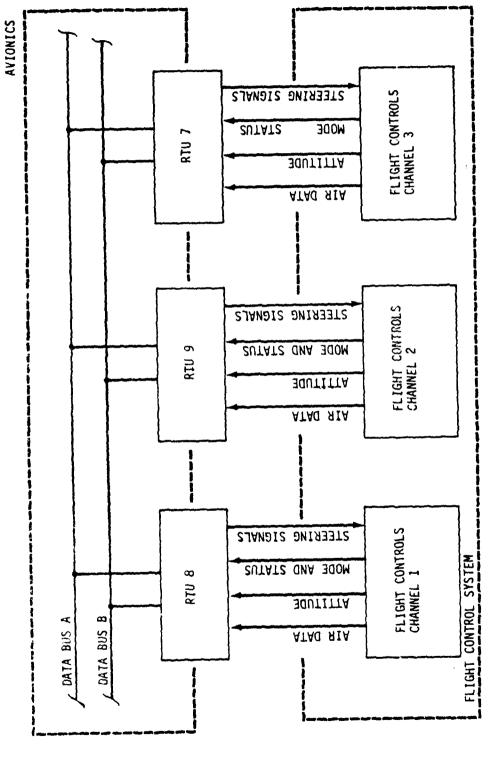


Figure 3.1-7 Avionics/Flight Control System Interface

#### 3.1.1.2.2.2 Communications

IDAMST provides the flight crew with the capability to control various communication devices for air-ground, air-air, and internal communications. A description of the function(s) associated with each device is given below.

The Intercommunication Set (AN/AIC-18) provides:

- o two-way voice communication between crew stations
- o interfaces with radio tranceivers, navigation receivers, public address amplifier, and maintenance intercom outlets

The ICS allows for selection, control, and distribution of radio systems for airborne/ground station communication and monitoring.

The P.A. System (AN/AIC-13) is used for voice announcements in the cargo areas.

The two UHF-AM (AN/ARC-164) are used for military communications and as backup ADF receivers. They provide short-range, line-of- sight, two-way simplex voice communication with ground systems and other aircraft, operating in the 225-399.95 mHz frequency band. When the radio is in backup ADF mode, bearing is obtained via the ADF EQUIP.

The VHF-AM radio (Wilcox-807A) is used for CCT and civilian communications. It provides two-way simplex 160 nautical mile voice communication in the 118 - 135.975 mHz frequency band over line-of-site propagation paths.

The VHF-FM radio (FM622A) is used primarily for military/CCT communications. It provides short-range line-of-sight, two way simplex voice communication in the  $30-75.95\,\mathrm{mHz}$  frequency range.

The HF/SSB radio (AN/ARC-123) is used for long-range military communications. It provides two-way simplex voice communications at distances up to 2,500 nautical miles, operating in the  $2-30\,\text{mHz}$  frequency band.

The Secure Voice System (TSEC/KY-58)encrypts and decrypts VHF/UHF voice communication.

The IFF/SIF (AN/APX-101) is used for automatic radar identification and position/altitude reporting in the civil air traffic control system and similar data in the tactical traffic control environment. Its operational frequency band is 1030 - 1090 mHz.

Control is implemented by the flight crew via IMK. The particular control associated with each device shall be as shown in Figure 3.1-8.

### 3.1.1.2.2.3 Navigation and Guidance

IDAMST provides an Integrated Navigation System (Figure 3.1-9) which performs the following functions:

COMMUNICATIONS CONTROL FUNCTIONS

	SEC VOICE ON/OFF	(NOTE)		
	HF/SSB	ON/OFF SSB AME FREQ SHIFT KEY CW *FREQ SEL *SQUELCH DISABLE NOISE BLANK RF GAIN *VOLUME	P.A. ON/OFF	(NOTE)
	IFF ON/OFF	(NOTE)	P.A.	)X)
	VHF-FM	OFF T/R RE-TRANS HOME *FREQ SEL SQUELCH DISABLE CARRIER TONE *VOLUME		
•• -	VHF-AM	ON/OFF *FREQ SEL SQUELCH DISABLE *VOLUME	ICS ON/OFF	(NOTE)
· -	UHF #2	OFF 1/R+5 ADF GUARD XMIT *CHAN SEL *FREQ SEL CHAN PRESET SQUELCH DISABLE *VOLUME	ICS 0	ON)
	UHF #1	OFF T/R+G ADF GUARD XMIT *CHAN SEL *FREQ SEL CHAN PRESET SQUELCH DISABLE		

\*DEK INPUT

NOTE: DEDICATED CONTROL PANELS FOR - IFF
- SECURE VOICE
- INTERCOMM AND PA

FIGURE 3.1-8 COMMUNICATIONS EQUIPMENT CONTROL REQUIREMENTS

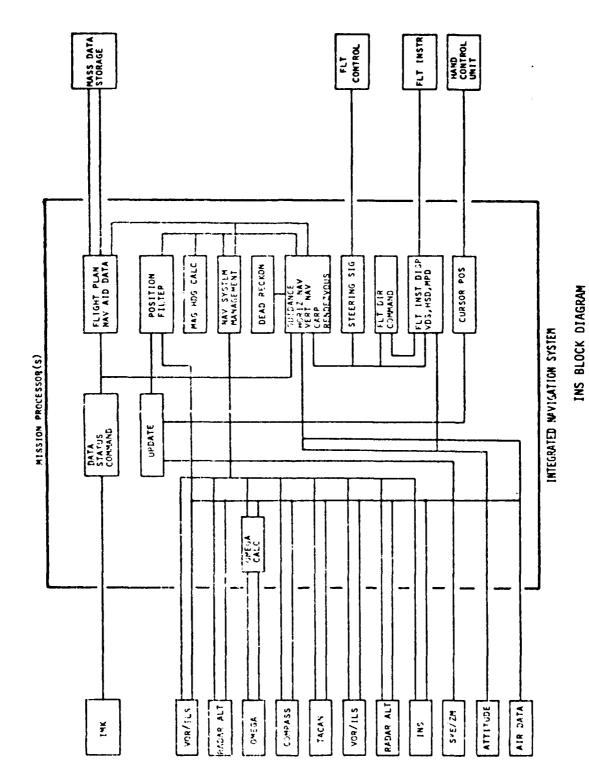


FIGURE 3.1-9

22

#### Area Navigation

The following enroute and terminal navigation functions are provided:

- Automatic three dimensional navigation and guidance within the ATC environments
- o TACAN slant range correction
- o Automatic tuning of navigation radio receivers
- o Great circle navigation and optimization of navigation position
- Route and terminal navigation data storage capacity adaptable to Air Force requirements
- o Simple reversion to VORTAC or Inertial navigation
- o Offset track capability

### Computed Air Release Point (CARP)

Automatic CARP calculation capability shall be provided. Means of entering load characteristics, wind data, relative target location, and position update capability shall be designed for pilot ease of operation.

#### Rendezvous

Mavigation data will be processed to compute guidance and steering data to enable rendezvous with other aircraft.

### Flight Director

Flight Director Command Signals are provided for display on the pilots' Altitude Director Indicator.

#### Steering

Steering signals are provided for the Flight Control System.

To accomplish the above functions, the following sensors are provided:

- o The TACAN System (AN/ARN-118) furnishes data relative to a selected TACAN facility operating in the 962 1213 mHz frequency band.
- o The two Radar Altimeters (AN/APN-194) are range tracking radars which provide altitude information from 0 5000 feet.
- The OMEGA Radio Navigation System (AN/ARN- ) provides airplane position fixes using the worldwide network of VLF ground transmitters.

- The Magnetic Compass (C-12) provides heading information for navigation.
- o The LF/ADF (DF-206) provides the navigation calculation with bearing to a selected low frequency radio station.
- o The UHF/ADF (DF-301E) provides the navigation calculation with bearing to a selected ultra-high frequency radio station.
- o The INS (carousel IV) is a self-contained inertial navigation system (including a digital computer) which provides worldwide aircraft navigation entirely independent of ground communication.
- o The Instrument Landing System (AN/ARN-108) is used in conjunction with ground transmitting equipment and airplane flight director calculations to provide display capability for marker beacon, glideslope, and localizer signals.
- o The Station Keeping Equipment (AN/APN-169) is a cooperative air-to-air station keeping system for flights of up to 36 aircraft. It enables these aircraft to locate and identify one another; and to maintain formation/rendezvous regardless of visibility. The SKE interfaces with the MDSC to provide a formation display.
- o The Long Range Radar (AN/APQ-122) provides precise navigation capabilities for long-range ground mapping, weather detection, and beacon interrogation. A high-resolution CRT radar display is available to the crew upon request. Data is input into the navigation function via HCU in conjunction with the CRT display.
- o The Flight Control System provides air data, attitude, and mode and status information. This information is processed by the avionics system to provide steering data for the flight control system.

Sensor control is implemented by the flight crew via IMK. The particular control associated with each sensor shall be as shown in Figure 3.1-10.

#### 3.1.1.2.2.4 Payload

IDAMST functions in this area consist of providing payload status reporting and automatic load release control.

#### Status

The Applications Software shall monitor, maintain and report (via CRT display) status of -

- o Ramp and cargo door
- o Chute release
- o Caution signal

\*CHANNEL SELECT TEST X-Y \*SELECT COURSE ON-OFF \*LOW ALT SEL TEST \*IDENT VOLUME AUTO/MANUAL MODE SELECT RADAR ALTM #1 REC T/R A/A REC A/A TR TACAN 0N-0FF FREQ AGILE MODE ON-OFF HDG MKR INTENS RNG MKR INTENS SWEEP INTENS SCATTER HIGH \*RANGE SELECT FAST TIME ON-OFF SENS TIME L.R. RADAR BEACON
WEATHER
\*FREQ SELECT
\*MAG VAR SEL
RF POWER MODE SELECT AZ STABIL \*ISO ECHO STND BY SCAN SEL RIGHT LEFT BEAM 0FF ON-OFF AUTO/MANUAL INITIALIZE AUTO/MANUAL \*FREQ SELECT \*DATE VOR/1LS/MB=2 OMEGA 970-NO

ON-OFF \*LOW ALT SEL TEST

RADAR ALTM #2

DG \*SET HEADING \*SET LATITUDE

ON-OFF SLAVED

COMPASS

NAVIGATION CONTROL FUNCTIONS

INS

STANDBY AL IGN

-

\*DEK INPUT

FIGURE 3.1-10: NAVIGATION CONTROL REQUIREMENTS

VOR/ ILS/MB#1

ON-OFF AUTO/MANUAL \*FREQ SELECT

AUTO/MANUAL INITIAL POSITION \*WAY POINT LOADING \*UPDATE

ONS
S
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NO
16. F
NAN

		MANIGALION CONTROL TONCTIONS		
AIRDROP DATA ENTER	DIRECTION FINDER	SKE (IPS)	NAV DATA DISPLAY	NAV DATA ENTER
*LAT/LONG *TYPE *WEIGHT	LF-DF ON-OFF	ON-OFF FREQ A/FREQ B *IN TRK OFFSET	RNG BRG OFS WAY POINT	*ROUTE SELECT *WAY POINT LOAD *WAY POINT SEQ
*WIND *RELATIVE FIX -RANGE	*FREQ SEL TEST *VOLUME	*ALT OFFSET *CROSS TRK OFFSET *LDR # SEL *GOX MADN DNG	FROM-TO GS/5TK WIND	*PRESENT FOSITION MARK HOLD
*ALTITUDE	VHF-ADE ON-OFF	PRX WARN TONE ON-OFF PRX WARN TONE	PP PP MON NAVAID DATA	**UPDATE *NAVAID SELECT AUTO/MANUAL
	*FREQ SEL TEST *VOLUME	RESET MASTER-FOLLOW SEL MASTER IND BITE TEST		MANUAL SELECT *ALT SEL *ALT SEL
MAN	MANUAL	*RNG SCALE SEL *RNG MARK INTEN		*PITCH ATT CMD *FPA CMD
AUTO INS OME GA TACAI VORV FORM	AUTO INS OMEGA TACAN VOR/ILS FORMATION HDG SEL	DISPLAT CENIEKING BLANKING		*SEL CKSE *SEL MDA *SEL DH

\*DEK INPUT

FIGURE 3.1-10: NAVIGATION CONTROL REQUIREMENTS
Continued

- o Jump signal
- o Paratroop alarm
- o Aft door deflection

## Release Control

Cargo delivery control consists of a load release signal output from the CARP function.

## 3.1.1.2.2.5 Aircraft Systems

The IDAMST functions relating to this area include warning, caution/monitoring, electrical control, and test of the various subsystems.

## Warning

IDAMST incorporates either copied or generated warning functions. Copied warning functions are monitored at the flight crew's hardwired (dedicated) indicators and their status copied into IDAMST processors. Warnings are subsequently displayed on the  $c_{\rm LEN}$ 's primary flight displays and appropriate emergency checklist procedures are selected for display on the pilot's or copilot's MPD. Copied warning functions do not have responsibility for originating the warning signal. This is the responsibility of the affected system or equipment. Generated warning signals originate within the IDAMST system. Primary responsibility for detection and warning is an IDAMST responsibility.

Copied Warning functions shall be

Fire

Gear

Stabilizer Trim

Generated Warning functions:

Ground preximity warning shall be generated on the basis of aircraft altitude who very ground), vertical velocity, gear position, and flight mode. Visual aird airal warnings will be commanded.

Stall warning shall be generated on the basis of flap position, angle of ittack, and thrust computations in the STOL configuration. Visual reacout on flight instruments and the "stick shaker" command shall be initiated by the IDAMST system.

<u>law Speed</u> warning shall be generated when the computed airspeed approaches manimum airplane requirements. A visual warning will be provided.

 $\underline{\text{Overspeed}}$  warning shall be generated when the computed airspeed exceeds the airplane maximum speeds (VH/MH). Aural warning (clacker) and visual display shall be provided.

<u>EFCS</u> warning shall be generated when the IDAMST processor is error status is received from the Flight Control System. Aural warning and visual display shall be provided.

# Caution Monitoring

IDAMST provides secondary control for caution functions: It shall copy current status and provide (on request) an MPD procedure checklist display to assist the crew in determining the cause of the caution message. Monitored functions are derived from monitor sensors, and displays of significant parameters are provided to the crew via MPD display.

Copied Caution Functions shall consist of

Electrical System
Hydraulic System
Fuel System
Boundary Layer Control
Air Conditioning
Anti-Ice
Overhead Caution Annunciator
Brakes
EFCS

Monitored Functions shall consist of

Engine Parameters (N1, EGT, N2, FF, oil pressure and oil quantity) Flap Position (left USB, right USB, left outboard flap, left inboard flap, right inboard flap, and right inboard flap).

Control Surfaces Position (spoiler elevator and rudder)

Avionics Systems Hardware Status

## Electrical Control

Control is included in the IDAMST processor to provide automatic on/off control of the remote power controllers. Avionics power management is maintained based on the following criteria:

- o Manual crew entry
- o Automatic start-up
- o Master mode
- Minimal power requirements for overload conditions
- 6 Automatic reset of nuisance trips

IDAMST provides on/off control for the following:

## Instruments and Aircraft Systems

# o counting accelerometer

- o gear-up and locked-left
- o gear-up and locked-right
- o weight on gear left
- o weight on gear right
- o stick shaker 1
- o stick shaker 2
- o stab. trim position
- o flap position left
- o flap position right
- o fuel totalizer
- o engine 1
- o engine 2

# Communications

- o public address
- o intercommunication set
- o HF/SSB radio
- o VHF-AM radio
- o VHF-FM radio
- o UHF-AM radio 1
- o UHF-AM radio 2
- o IFF
- o secure voice

# Defensive Measures

- o IRD & W
- O RH & W
- o flares dispenser

# Navigation and Guidance

- o long range radar
- o radar altimeter 1
- o radar altimeter 2
- o magnetic compass
- o INS
- o OMEGA
- o ILS 1
- o ILS 2
- o LF ADF
- o UHF ADF
- o TACAN
- o SKE

# Controls and Displays

- o HUD 1
- o HUD 2
- o HSD 1
- o HSD 2
- o MPD 1
- o MPD 2
- o MPD 3
- o MPDG 1
- o MPDG 2 o DSMU
- o MDSC
- o MFDC
- o HCU
- o MMK

## Test

IDAMST shall incorporate a limited, in-flight test capability by virtue of BITE, software reasonableness test on input data or associated computed values, and correlation of sensor data by direct comparison with redundant hardware or similar hardware. The extent of in-flight testing which will be practical is <u>TBD</u>. Test data shall be recorded on the DITS recorder. Selected data shall also be input to the Crash Data Recorder.

#### 3.1.1.2.2.6 Defense

The IDAMST functions in this area are those associated with threat detection, warning, display, and flare dispensing.

## Infrared Detection and Warning System

The IRD & W System is a defensive countermeasure which detects heat sources. A quadrant-oriented threat display is produced automatically on an MPD upon detection. IRD & W crew control consists of on/off.

## Radar Homing and Warning System

The RHAW System is a defensive countermeasure which detects radar sources. A quadrant-oriented threat display is produced automatically on an MPD upon detection. RHAW crew control consists of on/off.

## Flares Dispenser System

The Flares Dispenser System contains four volleys of flares which are used as a defensive measure against infrared seeker threats. Crew control consists of on/off, and the capability to drop flare volleys in any combination, either individually or as a group. Flare status is displayed on request.

Simultaneous threat information from the IRD & W and RHAW Systems will be merged into one display.

#### 3.1.1.2.3 Software Interfaces

The only external software interface defined for the Applications Software is with the OFF Executive Software. The Executive Software provides services for the execution of real-time applications, sharing of common data, interprocessor communication, and communication with and between remote terminal units.

Those EHARS functions relating to the Applications Software are performed by code imbedded in the Applications Software. This interface is described in detail in Reference 2.1.3.2.

#### 3.1.1.2.3.1 Executive Software Interface

The Applications Software consists of Tasks, Comsubs, Compool Blocks, and Events.

Tasks and Comsubs are processing modules, containing executable code and local data. Compool Blocks are data modules used for communication between Tasks. Events are boolean values used for control interactions between Tasks.

Tasks interact with the Executive through Real Time Pseudo-Declarations and Real Time Pseudo-Statements.

#### 3.1.1.2.3.1.1 Tasks

Tasks are the principal components of the Applications Software.

At any time, any Task in the system has a "state". The possible states of a Task are shown in Figure 3.1-11 . Note that not all states are mutually exclusive; thus, a Task which is "executing" is also dispatchable, active and invoked.

Immediately following system initialization, one Task, the Master Sequencer, is Invoked by the Executive, and all other Tasks are in Uninvoked state. Thereafter, Tasks can be put into Invoked state (Scheduled) or put into Uninvoked state (Cancelled) only by Real-Time Pseudo-Statements executed within other Tasks.

Immediately after being Scheduled, a Task is Inactive; however, it has the potential to become Active, depending upon its Event Condition Set. The Event Condition Set is a collection of Conditions, each of which may be either "on" or "off". Each Condition has a "desired" value. When all the conditions in the Event Condition Set have their desired values, if the Task is Inactive, the Executive will put it into Active state. A Task may have a null Event Condition Set, in which case it can only be Inactive momentarily.

Each Condition in an Event Condition Set is associated with a set of Events. When any of these Events is set on, the Condition is set on; when any of these Events is set off, the Condition is set off. One Event may be associated with more than one Condition in an Event Condition Set. In addition, one Condition may be associated with a "Minor Cycle Event". These are Executive-generated Events which are set "on" at certain specified times and are otherwise inaccessible to the Application Software. If a Condition is associated with a Minor Cycle Event, it may not be associated with any other Event.

A Condition may be either Latched or Unlatched. A Condition associated with a Minor Cycle Event must be Unlatched. The sole difference between a Latched and an Unlatched Condition is that upon the Scheduling or Activation of a Task, the Unlatched Conditions are set to the undesired value. Thus, a Task can only be Activated by an Unlatched Condition when the value of that condition is changed to the desired value subsequent to the last Scheduling or Activation of the Task. By contrast, Latched Conditions are changed only

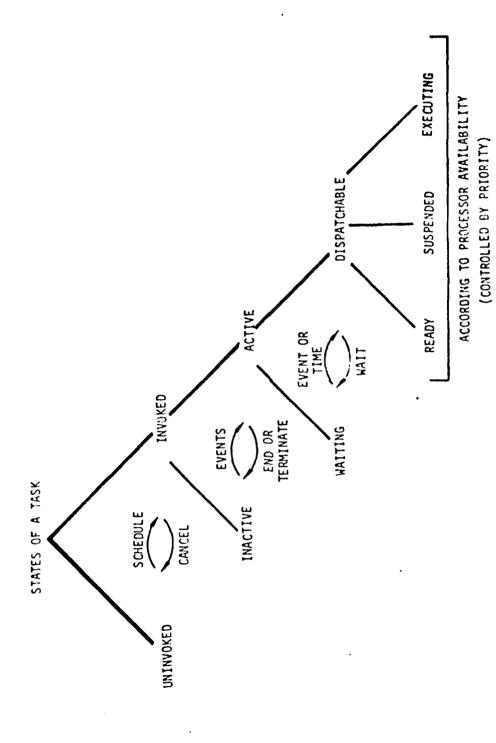


Figure 3.1-11 Task States and Control

when one of their associated Events is changed. Therefore, a Task with only Latched Conditions in its Condition Set will be immediately Activated after it is Scheduled if all the Conditions were satisfied before the Schedule Statement.

A Task may return from Active to Inactive state from two causes: either because it completes execution, or because it is forcibly Terminated by another Task. In either case, immediately after it returns to Inactive state, the Event Condition Set is evaluated, and if all the Conditions have their desired values, the Task is immediately re-Activated.

When a Task is Activated, it is immediately put into Dispatchable state. If, at any point during its execution, a Task executes a Wait Statement, the Executive will place it into Wait state until the specified condition is satisfied, upon which the Task will again become Dispatchable.

All Dispatchable Tasks should theoretically be executed immediately. However, since there may be more than one Dispatchable Task at any time within any one of the Processors, Tasks are ordered by Priority to resolve possible conflicts. Whenever the Executive in any Processor is not called upon for immediate action, it selects the highest Priority Dispatchable Task, and causes the Processor to execute it.

If a Task is Active but has not yet been executed, it is said to be Ready. If it has been in the process of execution, but has been interrupted by a higher priority Task, it is said to be Suspended. If it is executing, it is said to be Executing.

Any given Task may only be Scheduled by one Task, which is called its Controller. Two Tasks with a common Controller are said to be "siblings". The Tasks Scheduled by any Task are said to be its "sons". If a Task has no sons, it is said to have no "descendents:" otherwise, its descendents are its sor; and all the descendents of its sons.

Only a Task's Controller may Cancel or Terminate it; however, when a Task is Cancelled or Terminated, all of its descendents are Cancelled or Terminated. If a Task attempts to Cancel or Terminate itself, it will Cancel or Terminate all of its descendents, but will leave its own state unchanged.

#### 3.1.1.2.3.1.2 Comsubs

In addition to Tasks, the Applications Software may include another kind of processing module, known as the "Comsub". A Comsub may be called from many Tasks; there is a copy of each Comsub in any processor containing a Task from which the Comsub may be called.

A Comsub communicates with a Task which calls it only through its parameters and/or function result. No Comsub may execute any Real-Time Pseudo-Statements; however, one Comsub may call another.

When a Task calls a Comsub, the Task is considered to be executing within the code of the Comsub. Thus, it is possible for one Task to be suspended within the code of a Comsub at the same time that another Task is executing within

the same Comsub. In other words, A Comsub must be re-entrant. To implement this, every Task has a Comsub Local Storage Area assigned by PALEFAC for storage of local data by the Comsubs which it calls. At any time, there is a Comsub Stack Pointer which points to the area available for storage to the next called Comsub. This Comsub Stack Pointer is considered to be part of the process state of the Task, and is saved upon the occurrence of an Interrupt.

## 3.1.1.2. 3.1.3 Compool Blocks

All communication of data between Tasks or between Tasks and the external environment (RT's) is done by means of "Compool Blocks".

Conceptually, a Compool Block is a Block existing outside of any Task. No Task may directly access a Compool Block when a GLOBAL Copy is declared; instead, a Task references a "Local Copy" which has size and attributes identical to the Compool Block. A Task may copy the Compool Block into its Local Copy by a READ Statement, or copy the Local Copy into the Compool Block by a WRITE or TRIGGER statement. From the point of view of the Application Software, READs, WRITES, and TRIGGERs occur instantaneously, so a Compool Black can never be read when it has been partially updated by a WRITE. If a Global Copy has been declared, then the task in which the Compool is declared Global Copy is allowed to access the Global Data Block directly, rather than using Executive Read and Write Requests into and out of local copies of Global data blocks. The Executive Read and Write Requests will not actually move the data if the requesting task has declared the Global Data Block as a GLOBAL'COPY rather than as a LOCAL'COPY. The GLOBAL'COPY provides for the same central control of table formats as the LOCAL'COPY does.

Compool Blocks are divided into three classes: Input, Output, and Intertask. Input Compool Blocks can only be accessed by Tasks in a READ statement. Their values are determined by RT's. Output Compool Blocks can only be accessed by Tasks in a WRITE or TRIGGER statement; their values are "received" only by RT's. Intertask Compool Blocks are used solely for communication between tasks.

Since a Compool Block may be accessed in more than one processor and also, possibly, in an RT, Compool Blocks may exist in multiple copies. Any processor in which a Compool Block is read has a Physical Copy of the Block; any RT which references the Block, or any processor which only WRITEs or TRIGGERs the Compool Block, is considered to have a Virtual Copy of the Block. To maintain consistency between the various copies of a Compool Block, the Executive must send Compool Update Messages across the Data Bus. Compool Blocks are further classified according to when these Update Messages are sent as: Synchronous, Asynchronous, and Critically Timed.

Synchronous Compool Blocks are updated from a single authoritative Copy, whether in a processor or an RT, at a specified rate and phase. All copies of an Asynchronous Compool Block are updated when any of those copies are changed, either by the hardware of an RT or by a WRITE statement within a processor. Critically Timed Compool Blocks are a special category used only for Output. They may only be TRIGGERed within a Task. A TRIGGER statement includes a "time to go". The Master Executive sends the Update to the appropriate RT at the specified time.

The various categories of Compool Blocks are shown in Table 3.1-2, along with the ways which they may be referenced in a Task.

The first word of each Physical Copy of a Compool Block is a "Minor Cycle Time Tag" which indicates the last time the Physical Copy was updated.

## 3.1.1.2.3.1.4 Events

Events are used for control communication between Tasks. An Event has two possible values: on and off. A Task may READ the value of an Event, may WAIT on an Event, and an Event may appear in the Event Condition Set of a Task.

There are two general classes of Events: Application Events and System Events. Application Events are set on and off explicitly by Tasks. System Events are set on and off by the Executive upon certain occurrences. The initial value of all events is off.

System Events are further classified as:

- o Task Activation Events,
- o Compool Update Events,
- o Minor Cycle Events.

Any Task may have an associated Task Activation Event. Such an Event is set on when the Task is Activated and set off when the Task returns to Inactive or Uninvoked state. The Activation Event associated with a Task must have the same name as the Task.

Any Compool Block may have an associated Compool Update Event. Such an Event is set on when the Compool Block is updated, either by a Task or an RT. The Update Event associated with a Compool Block must have the same name as the Compool Block.

Minor Cycle Events are set on by the Executive according to specified rates and phases. They may only be referenced in Event Condition Sets.

#### 3.1.1.2.3.1.5 Time

The Application Software may interact with time in two ways: it may reference absolute time, or it may specify that certain occurrences should happen cyclically. Absolute time is measured in seconds from the initialization of the system. Cyclic time is maintained in terms of Minor Cycles and Major Frames.

A Minor Cycle is the shortest period of time at which a cyclic occurrence may be specified. A Major Frame is the longest period of time at which a cyclic occurrence may be specified. There are a fixed number of Minor Cycles to a Major Frame (currently 64), and each Major Frame has a fixed duration (currently one second). Every Minor Cycle is numbered in order of its occurrence within a Major Frame, starting with zero.

	SYNCHRONOUS	ASYNCHRONOUS	CRITICALLY TIMED
INPUT	May be READ in in many Tasks	May be READ in one Task	
OUTPUT	May be written in one Task.	May be written in many Tasks.	May be triggered in in many Tasks.
INTERTASK	May be written in one Task, read in many Tasks.	May be written in many Tasks, read in many Tasks.	

Table 3.1-2 Categories of Compool Blocks

Cyclic occurrences are specified by period and phase. Period is the number of Minor Cycles between successive occurrences; phase is the Minor Cycle number of the first occurrence within any Major Frame. Clearly, O phase period.

In practice, Minor Cycles will not always occur exactly when they theoretically should, partly because of the inherent latency of a federated system; partly because the Data Bus may be overloaded in any given Minor Cycle. However, the Executive guarantees that these errors are not cumulative; it will always generate the next Minor Cycle as close as possible to the theoretical time, regardless of when the previous Minor Cycle occurred.

With one exception, the Minor Cycle is the finest granularity of time knowable with the system. Thus, when a Task reads the absolute time, it receives the theoretical time of the last Minor Cycle. The sole exception to this rule is the Critically Timed Compool Block. When a Task TRIGGERs such a Compool Block, the Executive will attempt to send the Update Message to the RT at the precise time specified.

#### 3.1.1.2.3.1.6 Real Time Pseudo-Declarations

Real Time Pseudo-Declarations are used to declare the real time entities referred to within a Task. There are four kinds of Real Time Pseudo-Declarations:

- o Task Declarations,
- o Event Declarations,
- o Compool Block Declarations.
- o Comsub Declarations.

Task Declarations are used to declare Tasks referred to in Real Time Pseudo-Statements. They create a reference to the Task Table A entry for the appropriate Task.

Event Declarations are used to declare Events referred to in Real Time Pseudo-Statements. They create a reference to the Event Table entry for the appropriate Event. If the Event is a Compool Update or Task Activation Event, it must be declared as such in this Declaration.

Compool Block Declarations are used to declare any Compool Blocks referenced in READ, WRITE, or TRIGGER statements. They do two things:

- o They create a reference to the Data Descriptor Block for the Compool Block,
- o They access the Compool within which the Compool Block is declared, and from it create a declaration for the Local Copy of the Compool Block.

A Compool Block Declaration must indicate whether a Compool Block is read, written updated (both read and written) or triggered within the Task.

Comsub Declarations are used to declare Comsubs called within the Task. They simply generate the appropriate REF PROC declaration.

## 3.1.1.2.3.1.7 Real Time Pseudo-Statements

The Applications Software requests the services of the Executive through Real Time Pseudo-Statements. There are 8 kinds of Real Time Pseudo-Statements:

- o Schedule Statements
- o Cancel Statements
- o Terminate Statements
- o Wait Statements
- o Signal Statements
- o Read Statements
- o Write Statements
- o Trigger Statements
- o EREĂĎ
- o INVOKED
- o TIME

Real Time Pseudo-Statements compile as calls to Executive routines, passing the appropriate information as parameters.

#### Schedule Statements

Schedule Statements are used by one Task to Schedule another Task. A Schedule Statement includes the following information:

- o The name of the Scheduled Task,
- o The priority of the Scheduled Task.
- o The Latched Conditions (if any) in the Event Condition Set of the Task.
- The Unlatched Conditions (if any) in the Event Condition Set of the Task.
- O The period and phase of a Minor Cycle Event (if any) in the Event Condition Set of the Task.

The Latched and Unlatched parts of the Condition Sets are defined by event expressions . The syntax for event expression is:

- < event expression>::=<condition>|<condition> AND < event expression >
- < condition>::=<event set>|NOT<event set>|
- < event set>::=<event>(<or set>)
- < or set>::=<event>|<event> OR < or set >

Each condition in this expression corresponds to a Condition in the Event Condition Set. The presence of a NOT indicates that the desired value is off; the absence indicates that the desired value is on. The Events named in the event set are the Events associated with the Condition. Note that although multiple Events associated with a single condition are combined with ORs, the actual value of the Condition is not necessarily the OR of the value of the Events. Thus, for instance, the Condition denoted by (A OR B) will be set off if Event A is set off, regardless of the value of Event B.

#### Cancel Statements

The Cancel Statement is used by one Task to put another Task into Uninvoked state. The Cancel Statement includes the name of the Task to be Cancelled. This Task must either be the Task within which the Statement is executed, of a son of that Task. If a son is cancelled, all the descendents of the son are also cancelled automatically. If a Task attempts to Cancel itself, it will not affect its own state, but will Cancel all of its descendents. If a Task specifies itself in a Cancel Statement, it must be declared in a Task Declaration within itself.

#### Terminate Statements

The Terminate Statement functions identically to the Cancel Statement, except that it de-Activates instead of de-Invoking Tasks. When the event condition set for the terminated task becomes true, the Task will become dispatchable.

## Wait Statements

Wait Statements are used by Tasks to place themselves into Wait State pending certain occurrences. There are four kinds of Wait statements:

- c Absolute Time Waits,
- o Relative Time Waits,
- o Latched Waits,
- o Unlatched Waits.

An Absolute Time Wait places the Task into Wait state until a specified absolute time. If the specified time has already occurred, this statement is a No-Op.

A Relative Time Wait places the Task into Wait state for a specified period of time. If the specified period is non-positive, this statement is a No-Op.

A Latched Wait places the Task into Wait state until a specified Event reaches a specified "desired value". If the Event already has the desired alue, this statement is a No-Op.

An Unlatched Wait places the Task into Wait state until the specified Event is changed to the specified value. This statement is never a No-Op.

## Signal Statement

A Signal Statement sets a specified Event to a specified value.

# Read Statement

A Read Statement copies the value of a specified Compool Block into the corresponding Local Copy. If the Compool Block is a Global Copy, then no data transfer occurs.

# Write Statement

A Write Statement copies the corresponding Local Copy into the specified Compool Block. If the Compool Block is a Global Copy, then no data transfer occurs.

# Trigger Statement

A Trigger Statement requests the Executive to send the Local Copy of the specified Compool Block to the appropriate RT in a specified time. The specified time must be between two Minor Cycles and one Major Frame from the time the Trigger Statement is executed.

## **EREAD**

EREAD yields the value of the Event which has been passed as an argument. This Event must have been previously declared in an Event Declaration.

## INVOKED

INVOKED is applied to a Task. This function yields the value TRUE if the task is Invoked, FALSE if it is not.

#### TIME

TIME returns the absolute time as a 31 bit signed integer signifying the elapsed time since system initialization.

3.1.1.2.3.1.8 Master Executive Interfaces

#### Master Sequencer Interface

At the end of Master Initialization or Master Re-Initialization, the Master Executive schedules the Master Sequencer task. This task then schedules the other Applications Tasks.

# Application System Error Interface

Applications Software can detect error conditions and communicate the conditions to the Subsystem Status Monitor. The primary source of errors will be the Equips functions. These functions will determine any errant status with equipment and sensors and communicate the errors to the Subsystem Status Monitor.

The Subsystem Status Monitor records the error and gathers error statistics. If the last error was within too short a time or there were too many such errors, the Subsystem Status Monitor invokes the Configurator. The Configurator will cancel errant functions if appropriate. If the errors are of such a magnitude to warrant reconfiguration, the Configurator can invoke the Reconfiguration function via the IO device function.

## 3.1.2 Applications Software Architecture

#### 3.1.2.1 Software Structure

The Applications Software is organized into:

- o System Control Modules
- o Operational Sequencers (OPSs)
- o Specialist Functions (SPECs)
- Display Processes (DISPs)
- Equipment Processes (EQUIPs)

as shown in Figure 3.1-12. A brief functional description of each is given below.

## System Control Modules

The four System Control Modules (Master Sequencer, Request Processor, Configurator, Subsystem Status Monitor) are responsible for initializing and controlling the Applications Software.

The Master Sequencer, the first Application's Software task activated by the Executive Software, performs data initialization and schedules the other System Control Modules. Its control interfaces are shown in Figure 3.1-13.

The Request Processor receives and interprets control panel input requests. It will activate appropriate software tasks to handle legal requests; illegal requests are ignored. Request Processor control interfaces are shown in Figure 3.1-14.

The Configurator controls the operation of application tasks. It is activated whenever a new Operational Sequencer or Brute Force Specialist Function is to be initiated, or when a severe equipment health problem is detected. Configurator control interfaces are shown in Figure 3.1-15.

The Subsystem Status Monitor maintains status of the avionics subsystems. If a subsystem has failed or is generating degraded data, it determines the type and severity of the problem, and activates the configurator if the severity is significantly high. The Subsystem Status Monitor control interface is shown in Figure 3.1-16.

#### Operational Sequencers

Operational Sequencers are responsible for the control of a particular mission phase. They are activated by the Configurator as a result of master mode selections, and by the current Handler Specialist Function whenever a new display page is requested. Operational Sequencer interface control is shown in Figure 3.1-17.

## Specialist Functions

Specialist Functions carry out computational and control functions required by an OPS or by the crew. The four categories are Computational, Brute Force, Tailored Mode, and Handler.

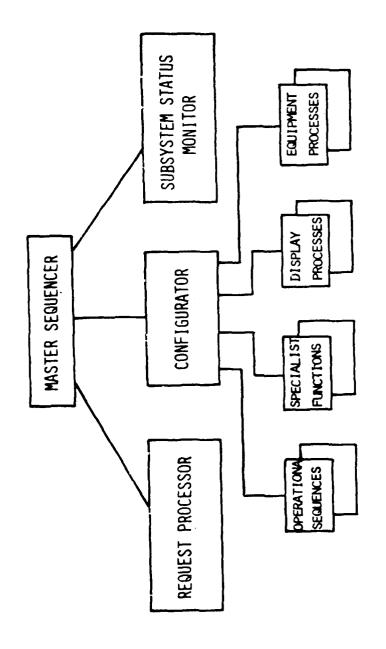
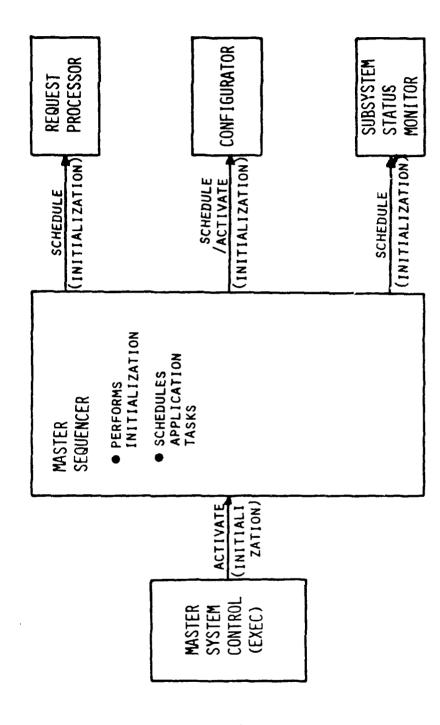


FIGURE 3.1-12 APPLICATIONS SOFTWARE ORGANIZATION



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FIGURE 3.1-13 MASTER SEQUENCER INTERFACE

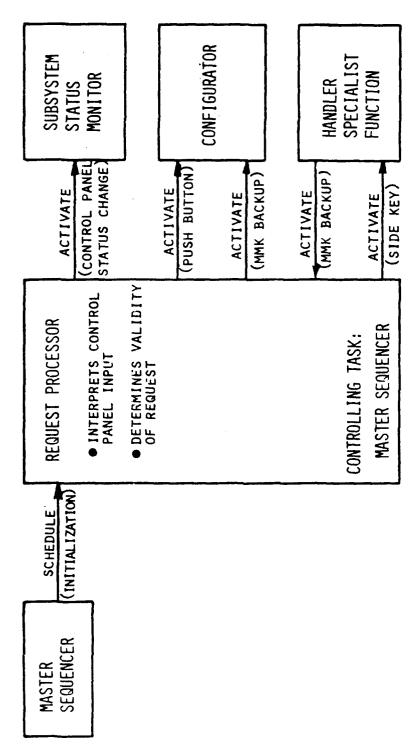
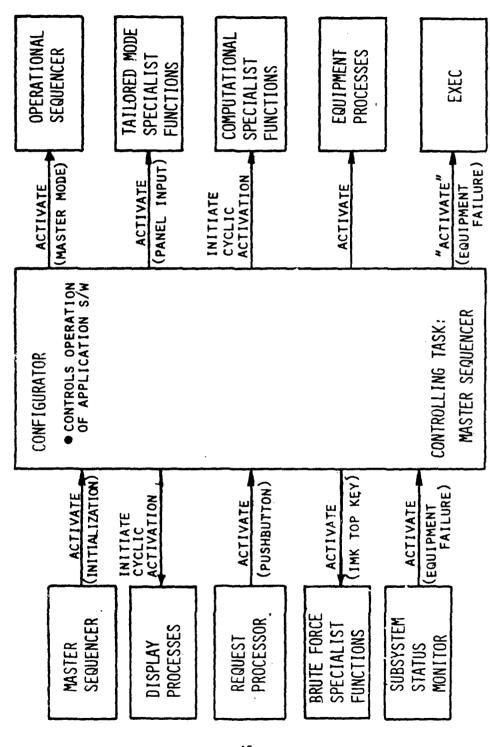


FIGURE 3,1-14 REQUEST PROCESSOR INTERFACE



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FIGURE 3.1-15 CONFIGURATOR INTERFACE

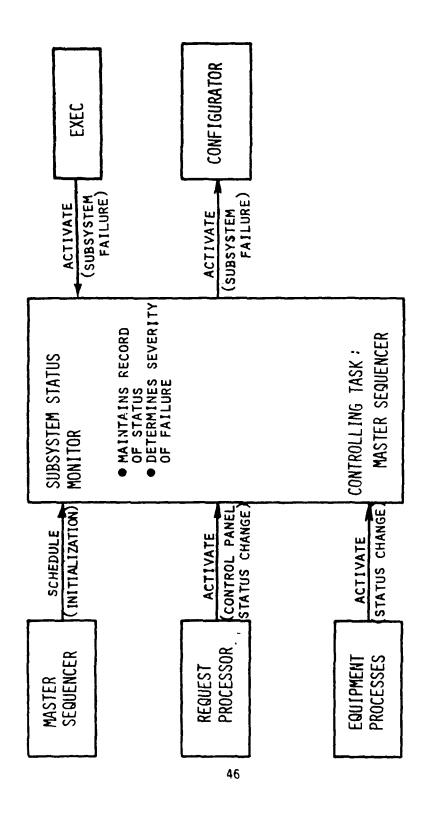


FIGURE 3.1-16 SUBSYSTEM STATUS MONITOR INTERFACE

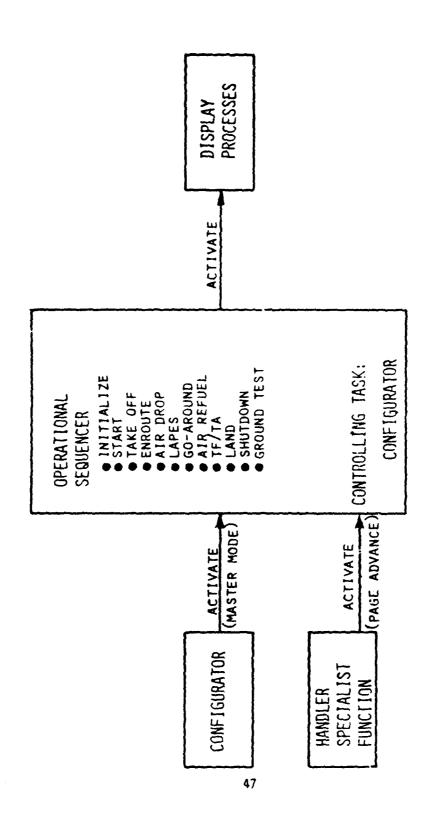


FIGURE 3.1-17 OPERATIONAL SEQUENCER INTERFACE

Computational Specialist Functions carry out cyclic processing and are usually active throughout most of the mission (e.g., navigation). Computational SPEC interface control is shown in Figure 3.1-18.

Brute Force Specialist Functions allow the pilot to initiate, sequence, and terminate mission operations that are not automatically available in the current OPS (e.g., sensor moding). They are accessed via the top keys on the IMK. Brute Force SPEC interface control is shown in Figure 3.1-19.

Tailored Mode Specialist Functions primarily perform those functions necessary to process selections by the crew via control devices (IMK, MFDC, HCU, CCA). They are activated by the current Handler Specialist Function to process IMK/DEK inputs, and by the Configurator to process other control requests. Tailored Mode SPEC interface control is shown in Figure 3.1-20.

Handler Specialist Functions perform the control processing involved with display pages. There is a Handler SPEC for each device: IMK, MPD. Handler SPEC interface control is shown in Figure 3.1-21.

## Display Processes

Display Processes control cockpit displays. They obtain data generated by various Application Software tasks, perform required scaling/formatting, and output the resulting data messages to compools for subsequent transmission to display hardware. Interface control for Display Processes is shown in Figure 3.1-22.

# Equipment Processes

Equipment Processes represent the Applications Software interface with IDAMST sensors.

Input Equipment Processes receive data generated by the sensors, perform required selection scaling, etc., and output the resulting parameters to a compool for use by other Applications Software tasks. They also monitor equipment status and initiate action when failure or degraded data is detected.

Output Equipment Processes receive data generated by various Application Software tasks, format corresponding sensor data/control messages, and output these messages to a compool for subsequent transfer to the sensor.

Interface control for Equipment Processes is shown in Figure 3.1-23.

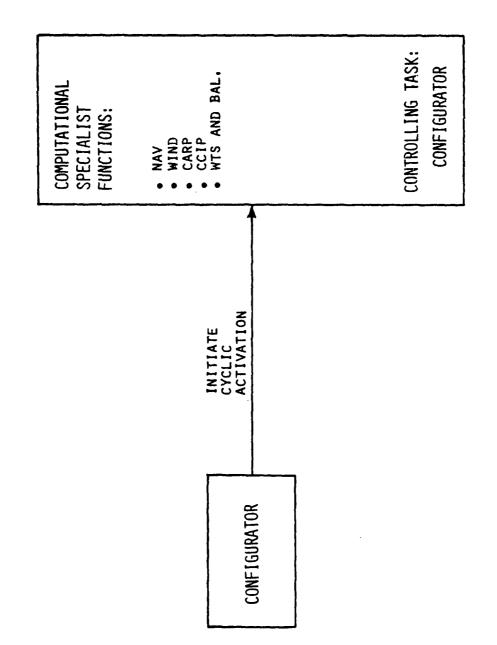


FIGURE 3,1-18 COMPUTATIONAL SPEC INTERFACE

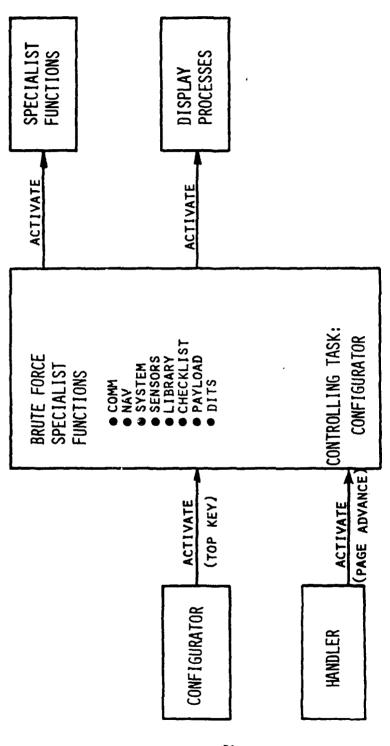


FIGURE 3.1-19 BRUTE FORCE INTERFACE

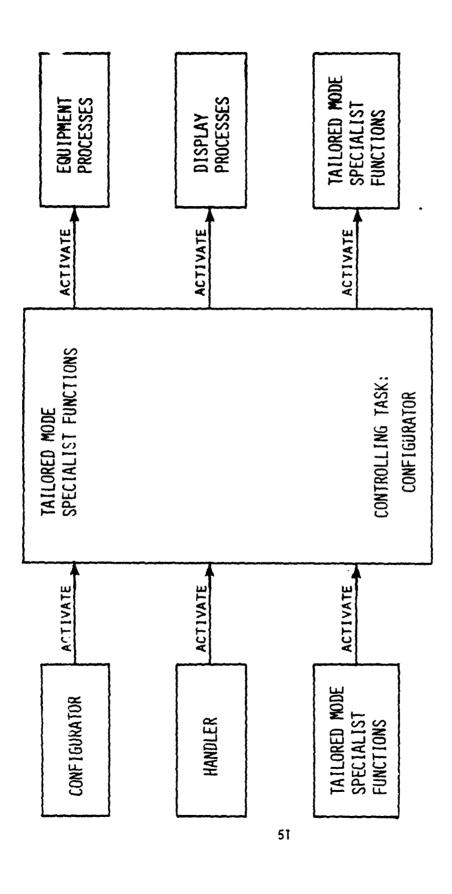


FIGURE 3.1-20 TAILORED MODE SPEC INTERFACE

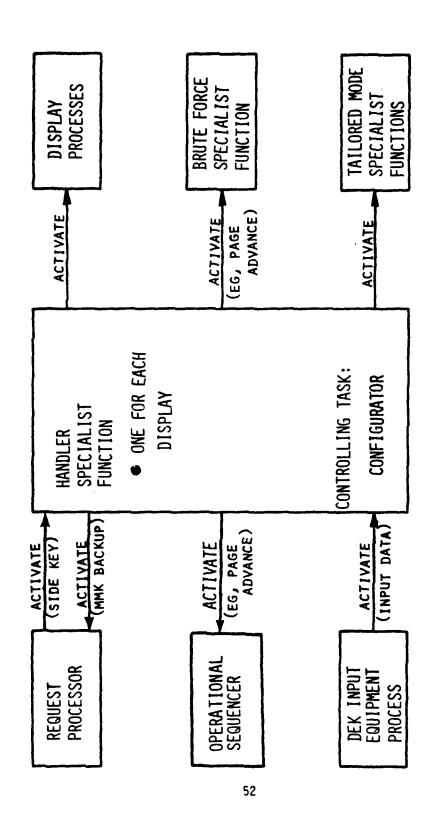


FIGURE 3.1-21 HANDLER INTERFACE

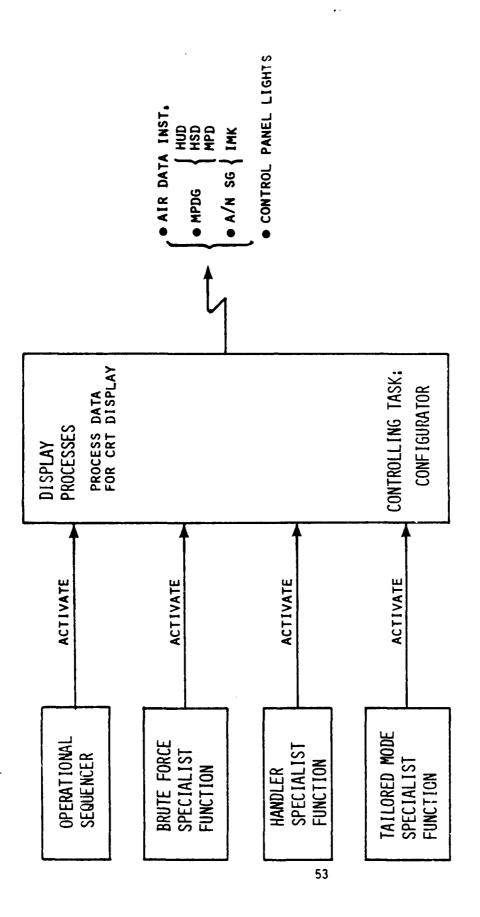


FIGURE 3.1-22 DISPLAY PROCESSES INTERFACE

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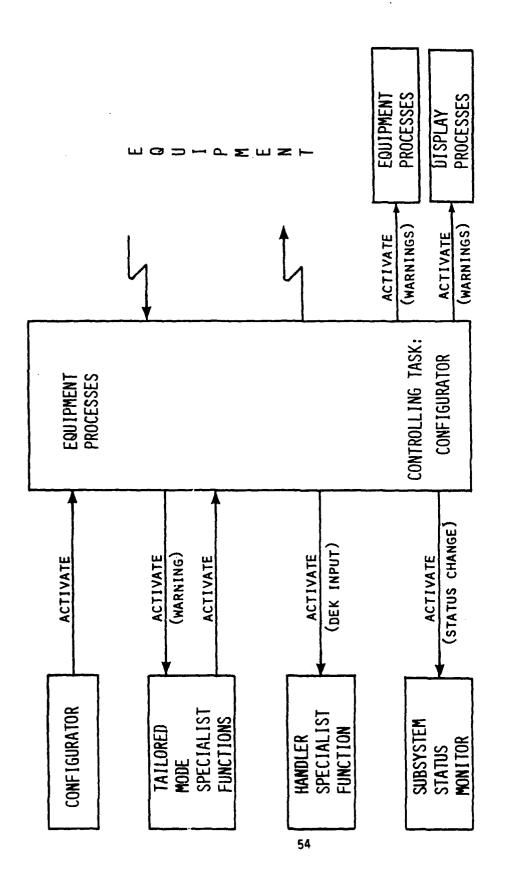


FIGURE 3.1-23 EQUIPMENT PROCESSES INTERFACE

# 3.1.2.2 Software Relationships

This section describes the control and data relationships of the various software components comprising the Application Software.

Figure 3.1.2-12 shows the primary control/data interfaces for the Applications Software. Appearing below is a more detailed explanation of each control interface:

Cyclic activation via Executive initiated by the Configurator. Activation of cyclic mode-dependent Computational Specialist Functions and Display Processes is initiated by the Configurator during transition from one mission mode to another.

The Computational Specialist Functions access data residing in a Compool for their calculations, and store the results in another software compool.

2. Cyclic activation initiated and cancelled by the Configurator. Activation of cyclic Equipment Processes, Air Data Display Processes, and certain Computational Specialist Functions is initiated by the Configurator during transition from the INITIALIZE mode.

Each input Equipment Process will access data moved by the Executive to a Compool, check the device status word, check for validity/reasonableness, generate substitute data (if necessary), convert/format the data, and store the result in an Applications Software Compool. If the device status has changed or if the device is generating incorrect/degraded data, the Subsystem Status Monitor is notified.

Each output Equipment Process will access data residing in an Applications Software Compool, scale/format the data, and store the result in a Compool for subsequent output.

Each output Display Porcess will access data residing in an Applications Software Compool, scale/format the data, and store the resulting parameter in a Compool for subsequent output.

3. Cyclic activation by the Executive, initiated when the Request Processor is scheduled by the Master Sequencer.

The Request Processor will access control panel data residing in a Compool, check the panel status word, decode/interpret any crew input, and store the result in an Applications Software Compool. It will then activate the Subsystem Status Monitor (if panel status has changed) or the IMK Handler Specialist Function (if IMK side key input) or the Configurator (other input).

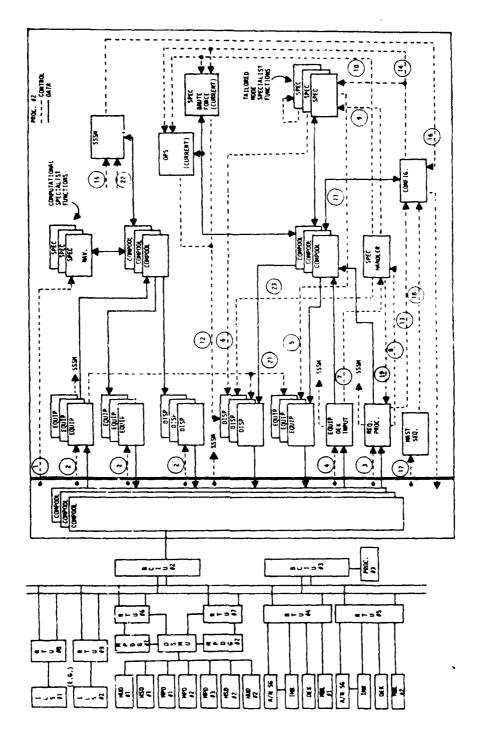


FIGURE 3.1-24 APPLICATIONS SOFTWARE RELATIONSHIPS

4. Synchronous activation by the Executive, initiated by the Handler Specialist Function; this cyclic activation is initiated when a side key select is received which requires DEK input, and is terminated when an Enter Key is recognized.

The DEK input Equipment Process will access data residing in a Compool, check device status word, and check data for Enter Key indication. If device status has changed, the Subsystem Status Monitor is notified. If an Enter Key is recognized, the input buffer is converted and stored in an Applications Software Compool and the Handler Specialist Function is activated.

5. Demand activation by Tailored Mode Specialist Functions.

Each output Equipment Process will access data residing in an Applications Software Compool, scale/format the data, and store the result in a Compool for subsequent output to the device.

6. Demand activation by Tailored Mode Specialist Functions.

Each output Display Process will access data resiging in an Applications Software Compool, scale/format the data, and store the resulting parameter in a Compool for subsequent output.

 Demand activation by DEK input Equipment Process indicating receipt of an Enter Key.

The Handler Specialist Function will access data residing in an Applications Software Compool pertaining to the IMK activity leading up to the DEK input request, and activate the appropriate Tailored Mode Specialist Function for action. A Display Process will be activated to note on the IMK that required DEK input is complete.

8. Demand activation by the Request Processor indicating receipt of an IMK side key.

The Handler Specialist Function will access data residing in a Compool, and if the indicated side key requires DEK input, cyclic activation of the DEK input Equipment Process will be initiated (via request to Executive Software), and a Display Process will be activated to note on the IMK that input is required.

If the side key requires a new IMK CRT page to be displayed, the current Brute Force Specialist Function, or if none, the current Operational Sequence, is activated to accomplish this.

IMK key status/history and other status pertaining to the IMK Handler Specialist Function is stored in an Applications Software Compool.

 Demand activation by the Handler Specialist Function indicating that processing of crew input selections (IMK side key and/or DEK input) is required.

The tailored Mode Specialist Function will access data residing in an Applications Software Compool (both input and status data), determine validity, perform processing, and store results in an Applications Software Compool. The proper Equipment Process will be activeed to complete the data transfer to the device.

Further, if the data requires an update of a current display, a Display Process is activated.

10. Demand activation by the Handler Specialist Function requesting a new CRT page.

The Operational Sequencer or Brute Force Specialist Function will access data residing in an Applications Software Compool and display the new CRT page.

 Demand activation by the Handler Specialist Function to display parameter values or to indicate DEK activity.

The Display Process will access data residing in an Applications Software Compool, scale/format the data if necessary, and store the result in an Executive Software Compool for subsequent output.

12. Demand activation by the Brute Force Specialist Function or Operational Sequencer to display the new display page.

The Display Process will access data residing in an Applications Software Compool, scale/format the data if necessary, and store the result in an Executive Software Compool for subsequent output.

 Demand activation by the Request Processor because of a control panel input.

The Configurator will access the input data residing in an Applications Software Compool and activate the appropriate Tailored Mode Specialist Function, Brute Force Specialist Function, or Operational Sequencer to perform the necessary processing.

14. Demand activation by the Configurator because of control panel input.

The Tailored Mode Specialist Function corresponding to the type of input (HCU, CCA, MFDC) will access data residing in an Applications Software Compool, and perform the processing required to satisfy the request. A Display Process will be activated to control panel lamp configuration.

The Operational Sequencer associated with the MMK selection will perform the necessary processing and control to establish the new mission mode. Display Processes will be activated to control new IMK/MPD pages, as well as panel lamp configuration.

The Brute Force Specialist Function associated with the IMK top key will perform the necessary processing to satisfy the request. The request may be to cancel the current Brute Force Specialist Function, change to another one, or establish a new one. Display Processes will be activated to control CRT pages on the IMK(s) and to control the top key lamp configuration.

15. Demand activation by input Equipment Processes or by the Request Processor.

The Subsystem Status Monitor will access data residing in an Applications Software Compool and store, if appropriate, in an Applications Software Compool to maintain the equipment status. If current status indicates a failure requiring a different software configuration, the configurator is activated.

 Demand activation by the Subsystem Status Monitor indicating an equipment health problem.

The Configurator will access data residing in an Applications Software Compool and etermine requires action. The Executive Software will be notified if the equipment failure is severe. Software re-configuration because of less severe failures will be handled by the Configurator.

17. One-time-only activation by the Executive to start the Applications Software.

The Master Sequencer will perform required initialization processing, and activate the Configurator to mode the Applications Software.

18. One-time-only activation by the Master Sequencer for Applications Software startup.

The Configurator will perform any required processing, and activate an Operational Processor to put the Application Software into an INITIALIZE mission mode.

19. Demand activation by the IMK Handler Specialist Function indicating the selection of a master mode from the MMK backup pages on the IMK.

Request Processor will process the input as it would MMK pushbutton input.

The Configurator will notify an Executive task for failures it cannot handle.

- 21. Demand activation by an EQUIP which determines a situation requiring a "WARN" action (e.g., CCA Shaker, Low Speed Warning Light, etc.).
- 22. Demand activation by the Executive when a device failure is detected.
- 23. Demand activation by Handler SPECs for IMK or MPD functions relating to DEK input, MPD checklist activity, new display pages.

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# 3.2 Detailed Functional Requirements

This section specifies the detailed functional requirements for the Applications Software.

The software components identified to satisfy these requirements are shown in Figure 3.2-1.

# 3.2.1 System Control Modules

## 3.2.1.1 Master Sequencer

The Master Sequencer performs data initialization, and initiates the scheduling and execution of the other System Control Modules.

## 3.2.1.1.1. Inputs

Input shall be  $\underline{\mathsf{TBD}}$  data required for initialization of the Applications Software.

## 3.2.1.1.2 Processing

Upon activation by the Executive, the Master Sequencer shall

- o initialize mission data and carry out other initialization tasks for the particular software configuration
- o schedule the request processor, configurator, and sub-system status monitor tasks
- o activate the configurator

#### 3.2.1.1.3 Outputs

None.

# 3.2.1.2 Request Processor

The Request Processor receives and interprets control panel input requests. It is activated 8 times per second.

# 3.2.1.2.1 Inputs

## Input shall consist of

- o MMK Status, Pushbutton # (2 words)
- o IMK Status, Top/Side Key # (2 words)
- o MFDC Pushbutton # (1 word)
- o CCA Status. Pushbutton # (2 words)
- o HCU Status, Pushbutton # (2 words)
- o MMK Backup Mode Select (1 word)

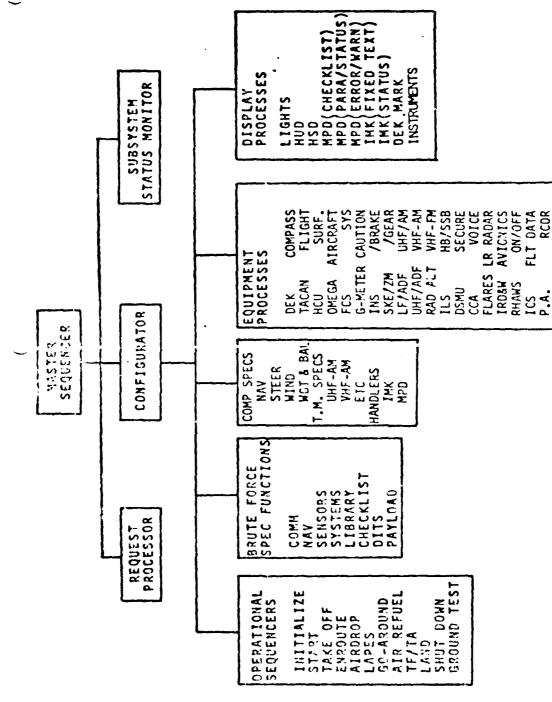


FIGURE 3.2-1 APPLICATION SOFTWARE COMPONENTS

### 3.2.1.2.2 Processing

The Request Processor shall access the input panel data to determine if any data has changed. If no change has occurred since the last activation, the Request Processor shall terminate.

If the input data from an IMK shows a side key select, the IMK Handler Specialist Function shall be activated; the Configurator shall be activated for IMK top key selections.

Valid pushbutton input from other source devices shall also cause the Configurator to be activated. The following pushbutton input shall be ignored:

- o non-supported pushbuttons (spares)
- o MMK input which would result in an out-of-sequence Master Mode situation (TBD)
- o MMK input identical to current MMK setting (i.e., repeated selection of same pushbutton)

The Request Processor is activated by the IMK Handler Specialist Function whenever the Master Mode backup capability is used. The processing shall be the same as the MMK input.

The Request Processor shall activate the Subsystem Status Monitor whenever the panel mode/health status changes.

3.2.1.2.3 Outputs

None.

## 3.2.1.3 Configurator

The Configurator controls the moding/operation of the application tasks.

#### 3.2.1.3.1 Inputs

Input shall consist of:

- o control panel input-pushbutton numbers (4 words)
- o equipment failure message (2 words)

#### 3.2.1.3.2 Processing

Upon activation by the Master Sequencer, the Configurator shall schedule and activate the INITIALIZE Operational Sequencer.

When activated by the Request Processor because of MMK select, the Configurator shall

- o cancel the current Operational Sequencer
- o set up the task configuration necessary for the new mode
- o activate the new Operational Sequencer

When activated by the Request Processor because of an HCU, CCA, or MFDC request, the CONFIG shall activate the appropriate Tailored Mode Specialist Function.

When activated by the Request Processor because of an IMK top key select, the CONFIG shall determine whether the new key select is identical to the previous one. If the new key select is different, the Configurator shall

- o cancel the current Brute Force Specialist Function
- o set up the necessary task configuration
- o activate the new Brute Force Specialist Function

If the key select is the same as the previous one (i.e., the IMK top key selected by the crew was backlighted green), the Configurator shall

- o cancel the corresponding Brute Force Specialist Function
- o set up the task configuration necessary for full resumption of the Operational Sequencer corresponding to the current Master Mode
- o activate the Operational Sequencer to initialize IMK CRT displays

When the Configurator is notified by the Sub-System Status Monitor of an equipment health problem, the Configurator shall inform the crew via MPD and either 1) re-configure to a backup or perhaps degraded mode for severe failures or 2) request the crew to take action. The Configurator shall signal the Master Executive for failures that it cannot properly handle.

#### 3.2.1.3.3 Outputs

#### Output shall consist of

- o Equipment failure message ID (1 word), MPD
- o Equipment failure notification (1 word), EXEC

## 3.2.1.4 Subsystem Status Monitor

The Subsystem Status Monitor maintains status of the avionics subsystems, and monitors changes in status.

#### 3 2.1.4.1 Inputs

Input shall consist of

- o Control panel status (4 words)
- o Device/sensor status (1 word)

### 3.2.1.4.2 Processing

The Subsystem Status Monitor is activated by the Request Processor upon a control panel failure or status change, or by an Equipment Process whenever a sensor has failed or is producing invalid/degraded data.

The Subsystem Status Monitor shall store the status to maintain error history and statistics. If an analysis of the data indicates a critical error, the Configurator shall be activated to perform error recovery.

#### 3.2.1.4.3 Outputs

Output shall be a one word message to the Configurator indicating the change in status of the subsystem.

o Status change message (n words)

# 3.2.2 Operational Sequencers

An Operational Sequencer (OPS) is a task responsible for the control of a particular mission phase, as determined by "Master Mode". It is scheduled, activated, and cancelled by the Configurator, as a result of crew Master Mode selections.

Operational Sequencers have been identified for the following IDAMST mission modes.

o Initialize

o Go-Around

o Start

o Air Refuel o TF/TA

o Takeoff

o Land

o Enroute

o Shutdown

O Air Drop O Lapes

o Ground Test

### 3.2.2.1 Inputs

# Input shall consist of

o Next Display ID (1 word)

#### 3.2.2.2 Processing

OPS control processing begins when the pilot selects a mission mode by depressing an MMK pushbotton or by depressing an MMK pushbotton or by depressing an IMK side key associated with the master mode backup display page. Processing continues until another master mode is selected or until the OPS is interrupted (suspended) by selecting a Brute Force Spec.

Initial processing common to all Operational Sequencers upon activation by the Configurator because of MMK input shall be

o Commanding MMK light configuration to correspond to the Master Mode selection

o Commanding IMK top key light configuration to OFF

- o Initiating tasks to generate those HUD, HSD, MPD displays defined for the master mode
- O Setting a DISP flag to change Master Mode in the MPDG

o Cancelling the IMK Status DISP if active

o Displaying a control page on each IMK CRT (this page contains the top level control capability available for the Master Mode)

o Activating the IMK Status DISP if necessary

Further, OPS processing depends on subsequent IMK side-key activation. The OPS **shall** display other (lower level) control pages as directed by the crew via side key selection.

When the OPS is notified by the IMK Handler to put up another display page (because of an "advance page" indicator or side key #), the OPS shall

o Cancel the IMK Status DISP if necessary

- o Display the requested page by activating the IMK Fixed Test DISP
- o Activate the IMK Status DISP if necessary

When a Brute Force Specialist Function is cancelled, the OPS is activated by the Configurator and shall

- Cancel the IMK Status DISP if active
- o Display the top-level control page on the IMK CRT
- o Activate the IMK Status DISP if necessary
- o Set IMK top key lamps OFF

#### 3.2.2.3 Outputs

#### Output shall consist of

- o MMK lamp on/off message (1 word)
- o IMK lamp off message (1 word)
- 3.2.3 Specialist Functions
- 3.2.3.1 Brute Force Specialist Functions

Brute Force Specialist Functions allow the crew to perform certain mission operations not automatically available to the Current OPS processing. These functions are scheduled, activated, and cancelled by the Configurator as a result of IMK top key selection by the crew.

Brute Force Specialist Functions have been identified for the following IDAMST functions:

o Navigation o Library o Communications o Checklist o Sensors o Payload o Systems o DITS

#### 3.2.3.1.1 Inputs

Input to any Brute Force Specialist Function shall consist of

o Next display ID (1 word)

### **3.2.3.1.2** Processing

Brute Force Specialist Function processing begins after being activated by the Configurator as a result of an IMK top key selection. Processing continues until there is another top key selection or until there is a Master Mode change. Initial processing common to all Brute Force Specialist Functions upon activation by the Configurator shall consist of

o Commanding IMK top key lamp configuration

o Cancelling the IMK Status DISP if active

o Initiating tasks to generate any HUD, HSD, MPD displays defined for the particular Brute Force SPEC

o Displaying a control page on the requesting IMK CRT and activating the IMK Status DISP if necessary; this page contains the top level capability available for the function (i.e., Communication).

Further, Brute Force SPEC processing depends on subsequent IMK side-key activation. The Brute Force SPEC shall display other (lower level) control pages as directed by the crew via side key selection.

When the Brute Force SPEC is notified by the IMK Handler to put up another display page (because of an "Advance Page" indicator or side key #), it shall

- o Cancel the IMK Status DISP if active
- o Display the required page on the IMK CRT
- o Activate the IMK Status DISP if necessary

#### 3.2.3.1.3 Outputs

Output shall consist of

o IMK lamp control (1 word)

## 3.2.3.2 Computational Specialist Functions

Computational Specialist Functions carry out cyclic processing, and are either active throughout the mission (e.g., navigation) or throughout a particular mission mode (e.g., CARP).

Computational Specialist Functions have been identified for the following IDAMST functions:

- o navigation
- o steering
- o wind calculation
- o weights and balances

### 3.2.3.2.1 Navigation Computational Specialist Function

The Navigation SPEC is responsible for keeping track of the aircraft state, using input data from various sensor sources and from the crew. It is activated by the Configurator upon a Master Mode selection by the crew.

The Applications Software navigation function consists of the following subfunctions:

- o control
- o navigation modes:
  - auto
  - INS
  - OMEGA
- o manual update (position)
- o flight director
- o OMEGA
- o magnetic heading
- o CARP
- o rendezvous
- o go-around

#### 3 2.3.2.1.1 Control Subfunction

This subfunction provides overall control of aircraft navigation computation. It is activated four times a second throughout most of the flight.

#### 3.2.3.2.1.1.1 Inputs

### Input shall consist of

- n status (n words)
- n device moding (n words)
- o master mode (1 word)
- o navigation mode (1 word)

### 3.2.3.2.1.1.2 Processing

This subfunction shall control the navigation computation procedure by de-

termining from Master Mode, device status, device moding, etc., the appropriate operational sequence.

3.2.3.2.1.1.3 Outputs

None.

3.2.3.2.1.2 Auto Mode

The Auto Mode subfunction provides for automatic (computer controlled) integrated navigation. The following functions are included:

- o flight planning
- o subsystem management
- o optimum position calculation/update
- o horizontal, vertical guidance calculation
- o performance monitoring
- o map display parameter update
- o augmented ILS

# 3.2.3.2.1.2.1 Inputs

Inputs for the various Auto mode subfunctions shall consist of .

o navigation subsystem data, as applicable (n words)

LF ADF - bearing

UHF ADF - bearing

VOR/ILS - bearing, loc/GS deviation

Radar Alt - altitude

OMEGA - position, velocity

Compass - heading

TACAN - bearing, distance

INS - position, velocity, attitude

SKE/ZM - range, bearing

Flight Controls - pitch, roll, turn rate, altitude, airspeed,

TAS, altitude rate, vertical speed

o IMK input data (n words)

Initialization data

Flight plan modifications

Subsystem control

Position update

- o HCU position update (n words)
- o Marker beacon data (n words)
- o Device status/moding (n words)

### 3.2.3.2.1.2.2 Processing

Auto navigation processing shall include the following capability:

# Flight Planning

- o organize/store appropriate Standard Instrument Departure (SID) and flight plan  $% \left( \frac{1}{2}\right) =\frac{1}{2}\left( \frac{1}{2}\right) +\frac{1}{2}\left( \frac{1}{$
- o execute/modify the flight plan as directed

# Subsystem Management

- o perform initialization
- o tune radios from flight plan data
- o verify subsystem performance

# Optimum Position Calculation/Update

- o combine various NAVAID data to derive optimum position
- o auto update
- o update optimum position with manual input data

# Horizontal, Vertical Guidance Calculation

o compare present position with flight plan to derive guidance information

# Performance Monitoring

- o establish and monitor subsystem performance criteria
- o estimate navigation accuracy and compare with mission requirements

# Map Display Parameter Update

o update present position and map display requirements

# Augmented ILS (Land Mode)

- o synthesize and smooth ILS data
- o computationally construct approach NAVAID

### 3.2.3.2.1.2.3 Outputs

#### Output shall consist of

o flight instrument display parameters

#### 3.2.3.2.1.3 INS Mode

This subfunction provides navigation capability using only input from INS. Updates can be performed manually.

It is activated by the Control subfunction four times per second whenever the INS mode has been selected.

# 3.2.3.2.1.3.1 Inputs

# Input shall consist of

- o INS data position, velocity, acceleration (n words)
- o flight plan information (n words)
- o radar updates (n words)
- o visual updates (n words)

# 3.2.3.2.1.3.2 Processing

## Subfunction processing shall provide capability to

- o maintain INS position
- o execute/maintain flight plan and calculate INS guidance outputs
- o INS manual update,

including reasonableness tests

# 3.2.3.2.1.3.3 Outputs

Output shall be inertial position and velocity from which INS guidance signals are derived and are available for display:

- o position and velocity (n words)
- o guidance parameters (n words)

# 3.2.3.2.1.4 OMEGA Mode

This subfunction provides navigation capability using only input from OMEGA.

It is activated four times per second by the Control subfunction whenever the  ${\sf OMEGA}$  mode has been selected.

#### 3.2.3.2.1.4.1 Inputs

### Input shall consist of

- o OMEGA position, velocity (n words)
- o TAS (1 word)
- o heading (1 word)
- o flight plan information (n words)

# 3.2.3.2.1.4.2 Processing

## Subfunction processing shall provide capability to

- o maintain OMEGA psoition
- o execute/maintain flight plan and calculate OMEGA guidance outputs
- o perform OMEGA smoothing with TAS and heading

#### 3.2.3.2.1.4.3 Outputs

Output shall be OMEGA position and velocity from which OMEGA guidance

signals are derived and are available for display:

- o position, velocity (n words)
- o guidance parameters (n words)
- 3.2.3.2.1.5 Manual Position Update

This subfunction generates update information from HCU, SKE/ZM, or IMK inputs.

It is activated by the Control subfunction whenever an update is requested.

3.2.3.2.1.5.1 Inputs

Input shall consist of present position

- o latitude, longitude (2 words)
- 3.2.3.2.1.5.2 Processing

This subfunction shall update position with the input data.

3.2.3.2.1.5.3 Outputs

None.

3.2.3.2.1.6 Flight Director

This subfunction generates flight director commands compatible with HUD to provide guidance to maintain designated flight path.

It is activated by the Control subfunction four times a second throughout the mission if the flight director is functionally switched "on."

3.2.3.2.1.6.1 Inputs

Input shall consist of navigation subsystem data

- o navigation data (n words)
- 3.2.3.2.1.6.2 Processing

This subfunction shall calculate with the HUD.

flight director commands compatible

3.2.3.2.1.6.3 Outputs

Output shall consist of

- J pitch command (1 word)
- o roll command (1 word)
- o speed command (1 word)

#### 3.2.3.2.1.7 OMEGA

The OMEGA subfunction converts OMEGA RF input data to airplane position and velocity parameters. It is activated eight times per second by the Control subfunction if the data is used in the navigation calculations, as determined by current navigation moding.

3.2.3.2.1.7.1 Inputs

Input shall consist of

- o three channels RF (n words)
- o navigation mode (1 word)

# 3.2.3.2.1.7.2 Processing

3.2.3.2.1.7.3 Outputs

Output shall consist of

- o position, velocity (n words)
- 3.2.3.2.1.8 Magnetic Heading

This subfunction calculates magnetic heading.

It is activated four times per second throughout the flight by the Control subfunction.

3.2.3.2.1.8.1 Inputs

Input shall consist of

- o present position (n words)
- o stabilized heading (1 word)
- o stored magnetic variation (n words)

3.2.3.2.1.8.2 Processing

This subfunction shall compute magnetic heading for use in referencing radio navigation aids and displays.

3.2.3.2.1.8.3 Outputs

Output shall consist of

o magnetic heading (1 word)

# 3.2.3.2.1.9 CARP

The CARP subfunction calculates the air release point for delivering cargo to a ground target.

It is activated four times per second whenever the AIR DROP Master Mode has been selected.

## 3.2.3.2.1.9.1 Inputs

# Input shall consist of

- o ground target-latitude, longitude, altitude (3 words)
- o cargo type (n words)
- o cargo weight (n words)
- o wind (2 words)
- o relative fix-range, bearing (2 words)
- o aircraft parameters (n words)

### 3.2.3.2.1.9.2 Processing

**CARP shall** perform ballistic calculations to derive guidance and display parameters pertaining to a specified airplane-cargo-target situation.

Additionally, CARP shall perform CCIP calculations for display purposes as an aid to pilot when selecting drop point.

### 3.2.3.2.1.9.3 Outputs

## Output shall consist of

- o guidance data (n words)
- o display parameters (n words)

#### 3.2.3.2.1.10 Rendezvous

The Rendezvous subfunction computes guidance and steering parameters to enable rendezvous with other aircraft.

It is activated four times per second whenever the AIR REFUEL Master Mode is in effect.

#### 3.2.3.2.1.10.1 Inputs

# Input shall consist of

- o LR radar cursor position range, bearing (2 words)
- o UHF ADF bearing (1 word)
- o TACAN range, bearing (2 words)
- o IMK heading, position, air speed, etc. (n words)

# 3.2.3.2.1.10.2 Processing

This subfunction shall determine the availability/applicability of navigation data sources. For limited data, it shall perform necessary processing to obtain display information for manual steering.

When sufficient data is available, the subfunction shall:

- o calculate target position and associated display parameters
- o perform guidance calculation for intercepts and output flight control system and flight director steering data

### 3.2.3.2.1.10.3 Outputs

Output shall consist of target data and steering commands:

- o target (n words)
- o steering (n words)

#### 3.2.3.2.1.11 Go-Around

The Go-Around subfunction provides information which enables the pilot to perform a go-around during a missed approach. The missed approach parameters are pre-selected prior to the approach.

This subfunction is activated whenever the GO-AROUND Master Mode is in effect.

### 3.2.3.2.1.11.1 Inputs

Input shall consist of the missed approach parameters:

- o heading set (1 word)
- o altitude set (1 word)
- o course set (1 word)
- o minimum climb gradient (1 word)
- o course-to-fix (1 word)

#### 3.2.3.2.1.11.2 Processing

Processing shall consist of incorporating the pre-selected, missed approach parameters into the navigation-guidance calculations. Parameters subsequently computed for display shall reflect this change in mode.

#### 3.2.3.2.1.11.3 Outputs

Output shall consist of the selected parameter(s) being stored in a Compool:

- o parameters (n words)
- 3.2.3.2.2 Steering Computational Specialist Function

The Steering function provides guidance signals to the flight control system. It is activated 16 times per second throughout the flight.

### 3.2.3.2.2.1 Inputs

Input shall consist of pertinent navigation data

- o navigation data (n words)
- 3.2.3.2.2.2 Processing

The processing consists of calculating steering signals compatible with the flight control system.

3.2.3.2.2.3 Outputs

Output shall consist of

- o pitch steer (1 word)
  o roll steer (1 word)
- o speed command (1 word)
- 3.2.3.2.3 Wind Computational Specialist Function

The Wind Computational SPEC calculates wind velocities, used in air drop algorithms and various displays. It is activated eight times per second throughout most of the flight.

3.2.3.2.3.1 Inputs

Inputs shall consist of

- o true airspeed (1 word)
- o aircraft velocity components (2 words)
- o heading (1 word)
- 3.2.3.2.3.2 Processing

The Wind SPEC shall calculate North and East wind velocity components.

3.2.3.2.3.3 Outputs

Output shall consist of

- o North wind velocity component (1 word)
- o West wind velocity component (1 word)
- 3.2.3.2.4 Weights and Balances Computational Specialist Function

This SPEC calculates weight and balance information for display purposes. It is activated four times per second throughout the flight.

# 3.2.3.2.4.1 Inputs

# Input shall consist of

- o aircraft weight (n words) o cargo data (n words)
- o fuel (n words)
- o etc.

# 3.2.3.2.4.2 Processing

Current aircraft weight and center of gravity shall be calculated based on fuel, fuel distribution, cargo data, etc.

# 3.2.3.2.4.3 Outputs

Output shall consist of

- o airplane weight (1 word)
- o center of gravity (1 word)

### 3.2.3.3 Tailored Mode Specialist Functions

Tailored Mode Specialist Functions perform those functions necessary to process crew control requests via IMK (primarily), MFDC, CCA, and HCU. They are activated by the current Handler Specialist Function to process IMK/DEK input and by the Configurator to process other control requests.

The following paragraphs describe identified IMK, MFDC, CCA, and HCU related Tailored Mode SPECS. Complete definition of LIBRARY, CHECKLIST, PAYLOAD, and DITS IMK control functions will result in the identification of additional Tailored Mode SPECS.

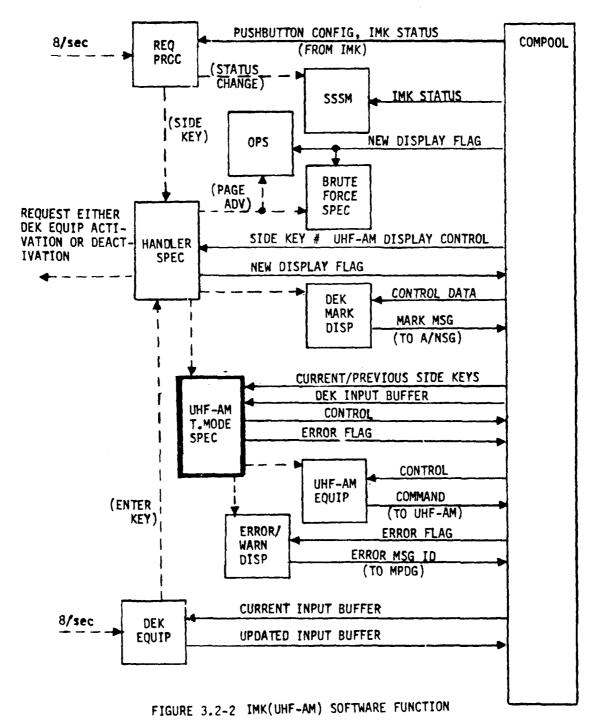
# 3.2.3.3.1 IMK Tailored Mode Specialist Functions

IMK Tailored Mode SPECS are activated by the current Handler SPEC following the receipt of input (either DEK or IMK side key) requiring processing.

IMK Tailored Mode Specialist Functions have been identified for the following IDAMST functions:

- o INS control
- o OMEGA control
- o ILS control
- o radar altimeter control
- o TACAN control
- o ADF control
- o navigation data entry
- o navigation data display
- o manual navigation moding
- o flight director control
- o avionics on/off control
- o CCA control
- o UHF-AM control
- o VHF-AM control
- o VHF-FM control
- o HF/SSB control
- o LR radar control
- o compass control
- o SKE control
- o counter measures control
- o status monitor and control
- o airdrop data entry
- o MFDC control
- o HCU control

The UHF-AM Tailored Mode SPEC, considered representative of the processing performed by IMK Tailored Mode SPECS, is described below. This SPEC processes requests for UHF-AM control, input via IMK. An example of the IMK software function using this SPEC is shown in Figure 3.2-2.



### 3.2.3.3.1.1 Inputs

Input shall consist of IMK side key history and, if applicable, a DEK input buffer:

- o present and previous IMK side keys (2 words)
- o DEK input buffer (n words)

Additionally, certain Tailored Mode SPECS shall need status data and/or other data for its processing. The UHF-AM Tailored Mode SPEC, for example, shall require a channel versus frequency table for certain processing.

### 3.2.3.3.1.2 Processing

The last side key selected shall determine the type of processing required. For the UHF-AM Tailored Mode SPEC, the side keys represent the following control:

- 1. off
- 2. T/R
- 3. T/R+G
- 4. ADF
- 5. Guard Xmit
- 6. channel select
- 7. frequency select
- 8. channel preset
- 9. squelch disable
- 10. volume

The previous side key shall determine the particular radio to be referenced. For the UHF-AM Tailored Mode SPEC, they represent:

- 1. UHF-AM #1
- 6. UHF-AM #2

Processing for side key numbers 1, 2, 3, 5, 9 shall consist of activating the UHF-AM EQUIP to send the proper control message.

Side key number 4 (ADF) select shall cause the status of the normal ADF capability to be checked. If normal ADF is operational, the control request shall be rejected. Otherwise, the UHF-AM EQUIP shall be activated to send the ADF mode control message.

Side key numbers 6, 7, 8, 10 have associated DEK input. The DEK input buffer shall be decoded with respect to the specific side key and checked. If invalid (e.g., out-of-range) the control request shall be rejected. If valid, processing shall consist of:

o Side key 6 (channel select) - The frequency corresponding to the selected channel is obtained from a frequency versus channel table residing in a Compool. The UHF-AM EQUIP is then requested to send this frequency to the radio.

- o Side key 7 (frequency select) The UHF-AM EQUIP is requested to send the input frequency to the radio.
- o Side key 8 (channel preset) DEK input for this side key consists of channel number and frequency. The Tailored Mode SPEC replaces the frequency value currently tabled versus channel number with the input frequency. Side key 8 results only in a Compool update; the UHF-AM EQUIP is not referenced.
- Side key 10 (volume) The UHF-AM EQUIP is activated to send the input volume to the radio.

Upon receipt of valid input, the IMK symbol (displayed to indicate that DEK input was necessary) shall be removed by activating the DEK Mark DISP.

#### 3.2.3.3.1.3 Outputs

Output shall be the desired control message to the EQUIP and/or Compool updates:

- o EQUIP control (1 word)
- o update data (n words)

### 3.2.3.3.2 MFDC Tailored Mode Specialist Function

The MFDC Tailored Mode SPEC provides the logic necessary to control MFDC pushbutton input. It is activated by the configurator when an MPD/HSD pushbutton is pressed. Figure 3.2-3 shows overall MFDC software function.

#### 3.2.3.3.2.1 Inputs

Input shall consist of:

- o pushbutton status, each device (5 words)
- o current pushbutton select (1 word)

#### 3.2.3.3.2.2 Processing

The MFDC Tailored Mode SPEC shall determine whether the input is legal and, if so, implement the desired display control.

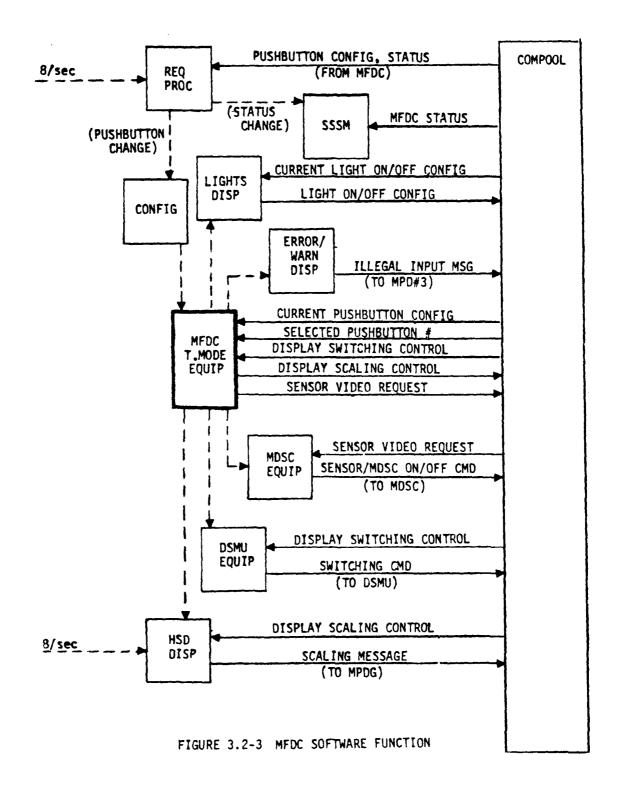
The DSMU EQUIP shall be activated if display switching is requested (e.g., switching HSD #1 display to the MPD #1 device).

The HSD DISP shall be activated if display revision is requested (e.g., HSD scaling).

The MDSC EQUIP shall be activated if a video display is requested (e.g., radar).

The LIGHTS DISP shall be activated to command the lamp configuration corresponding to the pushbutton status (as updated with new one).

If the pushbutton request is illegal (TBD) or if it cannot be satisfied



(e.g., radar turned off), an appropriate message shall be output to MPD #3.

## 3.2.3.3.2.3 Outputs

Output shall be the following control messages to be acted on by an EQUIP:

- o display switching (1 word)
- o display scaling (1 word)
- o radar/SKE/ECM display request (1 word)
- o MPD messages ID (1 word)

### 3.2.3.3.3 CCA Tailored Mode Specialist Function

The CCA Tailored Mode SPEC provides control logic to handle CCA pushbutton input. It is activated by the configurator whenever the CCA pushbutton is pressed. Figure 3.2-4 shows the overall CCA (pushbutton) software function.

## 3.2.3.3.3.1 Inputs

Input shall consist of

- o pushbutton identification (1 word)
- o current button status (1 word)

#### 3.2.3.3.3.2 Processing

The CCA Tailored Mode SPEC shall activate the ICS EQUIP to implement the desired control:

- o if hot-mic is "on," the EQUIP is requested to switch it "off"
- o if hot-mic is "off," the EQUIP is requested to turn it "on"

### 3.2.3.3.3.3 Outputs

Output shall consist of

- e hot-mic on/off control (1 word)
- 3.2.3.3.4 HCU Tailored Mode Specialist Function

The HCU Tailored Mode SPEC provides control logic to handle HCU display or radar antenna functions. It is activated by the configurator whenever control is requested via the pushbutton selects. Figure 3.2-5 shows the overall HCU software function.

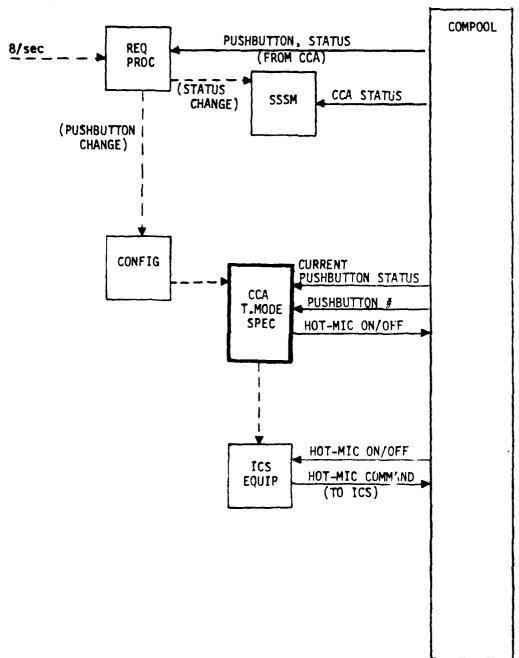


FIGURE 3.2-4 CCA(PUSHBUTTON) SOFTWARE FUNCTION

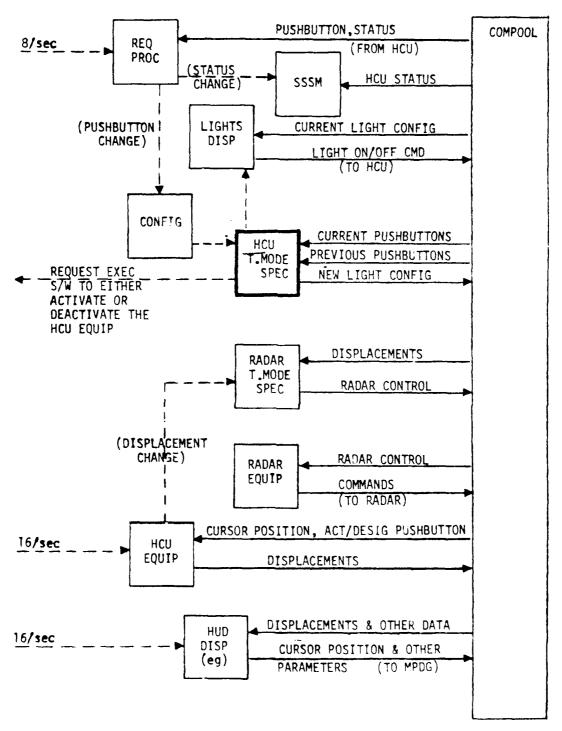


FIGURE 3.2-5 HCU SOFTWARE FUNCTION

BOEING AEROSPACE CO SEATTLE WA BOEING MILITARY AIRPL--ETC F/G 9/2 COMPUTER PROGRAM DEVELOPMENT SPECIFICATION FOR IDAMST OPERATION--ETC(U) NOV 76 NOV 76 PROGRAM AFAL-TR-76-208-ADD-2 NL AD-A083 113 UNCLASSIFIED 2 or 3

## 3.2.3.3.4.1 Inputs

Input shall consist of

- o pushbutton number (1 word)
- o pushbutton status (1 word)

### 3.2.3.3.4.2 Processing

When activated by the configurator, this function shall determine whether the pushbutton input represents a change in the current status from off-to-on. If so, it shall:

- o request cyclic activation of the HCU EQUIP (if inactive)
- o activate the LIGHTS DISP to command the proper light configuration

If the pushbutton input indicates a change in the current status from on-to-off, the HCU Tailored Mode SPEC shall

- o request deactivation of the HCU EQUIP (if active)
- o activate the LIGHTS DISP to turn off the light

# 3.2.3.3.4.3 Outputs

Output shall consist of

- o light on/off configuration (1 word)
- 3.2.3.4 Handler Specialist Functions

Handler Specialist Functions control processing for crew-IMK/DEK and crew-MPD/DEK interfaces. They provide the logic to control the display pages associated with the particular device.

There are always two Handler SPECS active: One for the IMK and one for the MPD (for checklist processing).

# 3.2.3.4.1 IMK Handler SPEC

The IMK Handler SPEC controls processing for all IMK display pages. It is scheduled by the configurator and activated by the request processor (for side key inputs) or by the DEK input EQUIP.

#### 3.2.3.4.1.1 Inputs

Input shall consist of

- o IMK side key number (i word)
- o table of control information for the page (10  $\times$  2 words)

### 3.2.3.4.1.2 Processing

When activated by the request processor because of a side key, the IMK Handler Specialist Function shall determine from the display control information whether:

- o DEK input is required
- o a Tailored Mode SPEC should be activated
- o the current GPS or Brute-Force SPEC should be activated to change displays

If DEK input is required for the specific side key number, the IMK Handler shall request cyclic activation of the DEK input EQUIP and displays a symbol on the IMK indicating that DEK input is required. If DEK input is not required for the side key number (and a new display is not requested), the IMK Handler shall activate the appropriate Tailored Mode SPEC. If the side key number is a request for a new display page (advance to lower level, return to higher level), the current OPS or Brute-Force SPEC task shall be notified. (If the DEK EQUIP is active when a side key input is received, it shall be deactivated.)

When activated by the DEK EQUIP, the IMK Handler shall activate the appropriate Tailored Mode SPEC to process the DEK input buffer, and then shall deactivate the DEK EQUIP.

The IMK Handler SPEC shall activate the request processor when the MMK backup capability is used.

# 3.2.3.4.1.3 Outputs

Output shall consist of:

- o IMK/MPD message ID noting that DEK input is required (1 word)
- o DEK mark control message (1 word)
- o Next display ID (1 word)

### 3.2.3.4.2 MPD Handler SPEC

The MPD Handler SPEC controls processing for all MPD checklist display pages. It is scheduled by the configurator and activated by the DEK input EQUIP.

#### 3.2.3.4.2.1 Inputs

Input shall consist of:

- o DEK input buffer (n words)
- o table of control information for display page (n x 2 pages)

# 3.2.3.4.2.2 Processing

When activated by the DEK input EQUIP, the MPD Handler SPEC shall determine the required processing:

- o item checkoff
- o skip item
- o advance page

MPD Handler processing for item checkoff shall consist of displaying a " $\sqrt{}$ " next to the item checked off, and then a " $\leftarrow$ " opposite the next item in the checkoff sequence.

 $\underline{\text{Skip items}} \text{ shall advance the "} \longleftarrow \text{" without checking off the item.}$ 

For <u>advance page</u>, the MPD Handler shall activate the MPD Checklist DISP to display the next checklist page.

3.2.3.4.2.3 Outputs

Output shall consist of:

- o DEK mark control message
- o next display ID (1 word)

# 3.2.4 Display Processes

Display Processes (DISPS) control cockpit displays. When activated, they obtain data/signals generated by the Application Software, perform required formatting, and output the resulting data messages to compools for subsequent transmission to display hardware.

Ten Display Processes have been identified for IDAMST:

- o LIGHTS Controls lamp on/off for the MMK, HCU, MFDC, IMK, Marker Beacon, Low Speed Warning, Ground Proximity Warning, EFCS Warning
- o INSTRUMENTS Controls dedicated cockpit instruments: Mach, Air Speed, Vertical Velocity, Altimeter, Accelerometer
- o HUD Controls HUD for given Master Mode
- o HSD Controls HSD for given Master Mode
- o MPD CHECKLIST Controls MPD checklist display pages
- o MPD PARAMETERS/STATUS Controls processing for the various MPD functional display pages
- o ERROR/WARNING MESSAGES Controls the outputting of error and warning messages to the crew
- o IMK FIXED TEXT Controls the display of IMK fixed text pages
- DEK MARK Controls DEK check/mark processing pertaining to checklist and data input functions on MPD/IMK
- o IMK STATUS Controls status displays output to the IMK center partition

#### 3.2.4.1 Lights Display Process

The Lights DISP commands lamp on/off configuration for: a) control panels, b) marker beacon, and c) warning lights. It is activated by the Application Software task responsible for controlling the lamp status of the particular display device.

### 3.2.4.1.1 Inputs

Input shall consist of

- o device ID (1 word)
- o desired configuration (1 word)

## 3.2.4.1.2 Processing

The Lights DISP shall format a message to command the desired on/ off configuration, and store the message in a compool to be sent to the device.

3.2.4.1.3 Outputs

Output shall consist of

- o lamp on/off command (1 word)
- 3.2.4.2 Instruments Display Process

The Instruments DISP updates the dedicated cockpit instruments:

- o mach and air speed indicator
- o vertical speed indicator
- o baro altitude indicator
- o g-meter

It is activated 16 times per second throughout the flight.

3.2.4.2.1 Inputs

Input shall consist of

- o flight control system data (n words)
- o minimum/maximum acceleration since reset (2 words)

# 3.2.4.2.2 Processing

The Instruments DISP shall obtain the input from a compool, calculate the parameters, perform scaling as required, and output the result to a compool for subsequent transfer to the instruments.

3.2.4.2.3 Outputs

Output shall consist of

- o mach number
- o air speed
- o vertical speed
- o baro altitude
- o acceleration (minimum, maximum, current)

## 3.2.4.3 HUD Display Process

The HUD DISP provides parameters to the MPDG for display on the HUD. It is activated 16 times per second throughout the flight except for Shutdown Mode.

### 3.2.4.3.1 Inputs

Input shall consist of:

- o parameter data (n words)
- o cursor position (2 words)

# 3.2.4.3.2 Processing

Upon activation, the HUD DISP shall calculate and/or scale those parameters required for all Master Modes. It then shall process those additional parameters required for the current Master Mode (except those purged by a declutter request). The particular parameters calculated for each Mode shall be as shown in Table 3.2-1.

### 3.2.4.3.3 Outputs

Output shall consist of:

- o parameters corresponding to Master Mode (n words)
- 3.2.4.4 HSD Display Process

The HSD DISP provides parameters to the MPDG for display on the HSD. It is activated 16 times per second throughout the flight except for Shutdown Mode.

## 3.2.4.4.1 Inputs

Input shall consist of:

- o parameter data (n words)
- o cursor position (2 words)

#### 3.2.4.4.2 Processing

Upon activation, the HUD DISP shall determine if an HSI display is "assigned" to any MPD. If so, those parameters required by the MPDG to generate the HSI display shall be calculated and/or scaled.

The HUD DISP shall then determine if a MAP display is "assigned" to any MPD. If so, those parameters required by the MPDG to generate the MAP display shall be calculated and/or scaled.

The parameter/functions provided by the MPDG shall consist of:

## HSI

distance to waypoint time to go heading and heading annunciator bearing pointers (2) bearing identifiers

TEST. SHUT GO AROUND LAND LAPES TA/TF TABLE 3.2-1: HUD PARAMETERS AIR DROP \* AIR REFUEL TAKE OFF ENROUTE START (ROLL) (PITCH) (BARO) (RADAR) SPEED ERROR LIMIT BOX (CS/LOC) VERTICAL VELOCITY TARGET DESIGNATOR CARGO RELEASE CUE VELOCITY VECTOR TERRAIN CONTOUR \* 'ELETE VIA DECLUTTER SW COMMAND INDEX DIRECTOR INFO WARVING INFO HUB FALL LINE CCIP HEADING ATTITUDE AIRSPEED ALTITUDE • D!SPLAY CURSOR

## HSI (Continued)

selected heading
selected course
to-from
deviation
vertical deviation path pointer
vertical track change alert
lateral track change alert
offset annunciator
nav. mode annunciator
heading warn
navigation warn

#### MAP

map scale
way points
navaids
key elevations
projected A/C position
"killer" data
alternate track
airport/target location
(cursor position)

## 3.2.4.4.3 Outputs

# Output shall consist of

- o HSI display parameters (n words)
- o MAP display parameters (n words)

## 3.2.4.5 MPD Checklist Display Process

The MPD Checklist DISP displays requested checklists. It is activated by the MPD Handler Specialist Function whenever a checklist is to be displayed on an MPD.

## 3.2.4.5.1 Inputs

# Input shall consist of

- o device identification (1 word)
- o checklist identification (1 word)

## 3.2.4.5.2 Processing

The MPD checklist DISP shall format the specified checklist on the specified MPD. MPDG message for displaying the

### 3.2.4.5.3 Outputs

Output consists of a control message:

- o MPDG control (1 word)
- 3.2.4.6 MPD Parameters/Status Display Process

The MPD Parameters/Status DISP controls the various MPD displays. It is activated once per second.

Table 3.2-6 gives the Display numbers which can be displayed on each MPD (e.g., Display #3 can only be shown on MPD #3). Tables 3.2-2 and 3.2-3 show the normal display configuration at the start of a given mission mode. Figure 3.2-6 is an example of a combined nav/comm display page.

### 3.2.4.6.1 Inputs

Input shall consist of:

- o display requests (2 words)
- o display status (3 words)
- o parameter status (n words)

# 3.2.4.6.2 Processing

Displays are changed via IMK request; the IMK Handler SPEC processes and stores these requests. At each activation, the MPD Parameters/Status DISP shall check the requests and update the MPD display status (Display number versus MPD number) table.

The DISP shall then obtain the current status for the parameters contained in the up-to-three displays and store them in a Compool for later transfer to the MPDG.

# 3.2.4.6.3 Outputs

Output shall consist of a) an output buffer to the MPDG containing display ID and parameter status for each and b) updated display status:

- o MPDG data buffer (n words)
- o display status (3 words)

# 3.2.4.7 Error/Warning Display Process

The Error/Warning DISP controls the outputting of MPD error and warning messages. It is activated by the task which either detects the error or determines the severity of the warning. The messages normally appear on the bottom two lines of the center MPD.

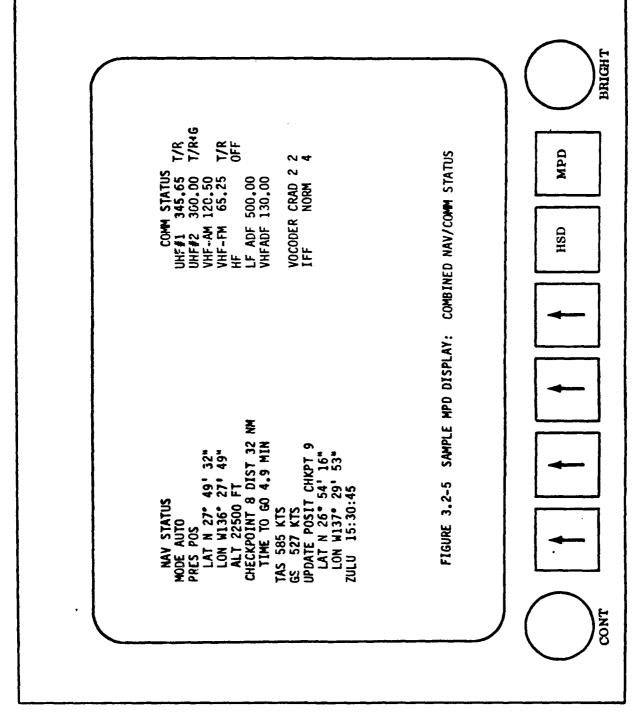
Display	MPD #1 <u>Pilot</u>	MPD #3	MPD #2 <u>Copilot</u>
Nav Status	<b>/</b>		<b>√</b>
Comm Status	✓		✓
System Status		✓	
Engine Parameters		J	
Departure Area Data	✓		
Take Off Parameters			✓
Cruise Parameters			✓
Refuel Status		✓	
Air Drop Flight Parameters	J		✓
Air Drop Area Data	✓		
Approach Data	✓		
Landing Area Data	✓		
Weight and Balance Data		/	
Weight and Fuel Data		/	
Flare Inventory		✓	
Low Speed Parameters			✓
Aircraft Systems Readout		✓	
Warning/Caution		✓	
Flight Data	✓		
LAPES Area Data	/		
Rendezvous Data	<b>/</b>		
SID	/		
STAR	J		
Delivery System Status		/	

TABLE 3.2-2 NOMINAL DISPLAY VERSUS MPD ASSIGNMENT

TABLE 3.2-3 NORMAL DISPLAYS AT BEGINNING OF MODE

MASTER MODE	MPD #1 PILOT*	MPD #3 CENTER	MPD #2 COPILOT*
START	1	ENGINE PARAMETERS	1
TAKEOFF	NAV STATUS DEPARTURE AREA DATA	ENGINE PARAMETERS	COMM STATUS TAKEOFF PARAMETERS
ENROUTE	NAV STATUS	ENGINE PARAMETERS	CRUISE PARAMETERS COMM STATUS
AIR DROP	FLIGHT DATA AIR DROP PARAMETERS	AREA DATA ENGINE PARA. DELIVERY SYS. STATUS	NAV STATUS COMM STATUS
LAPES	FLT DATA APPR DATA LAPES AREA DATA	ENGINE PARAMETERS DELIVERY SYS. STATUS	NAV STATUS COMM STATUS
AIR REFUEL	FLT DATA RENDEZVOUS DATA	ENGINE PARAMETERS AIR REFUEL SYS STATUS	NAV STATUS COMM STATUS
TF/TA	1	ENGINE PARAMETERS	NAV STATUS COMM STATUS
GO AROUND	FLIGHT DATA, SID LANDING AREA DATA	ENGINE PARAMETERS	NAV STATUS COMM STATUS
LAND	APPROACH DATA, STAR LANDING AREA DATA	ENGINE PARAMETERS	NAY STATUS COMM STATUS
SHUTDOWN	•	ENGINE PARAMETERS A/C SYSTEMS READOUT	,
GROUND TEST	ı	1	ı
			ورقاء والمستحدين والمسترة والمسترد والم

\* MODE-ORIENTED CHECKLISTS SHALL ALSO APPEAR AUTOMATICALLY AT BEGINNING OF MODE.



3.2.4.7.1 Inputs

Input shall consist of

o message number (1 word)

3.2.4.7.2 Processing

Using the input identifier, the Error/Warning DISP shall obtain the message from a compool and add current status, if necessary.

3.2.4.7.3 Outputs

Output shall consist of

o error/warning message (n words)

3.2.4.8 IMK Fixed Text Display Process

The IMK Fixed Text DISP controls the display of fixed-formatted pages on the IMK. It is activated by an Operational Sequencer or Brute Force Specialist Function wherever a new IMK page is to be displayed. Figure 3.2-7 shows a sample IMK Fixed-Text display.

3.2.4.8.1 Inputs

Input shall consist of

o page number (1 word)

3.2.4.8.2 Processing

This function shall format a message containing the page ID, and store it for transfer to the A/NSG. The actual "pages" are pre-stored in the A/NSG.

3.2.4.8.3 Outputs

Output shall consist of

o page number (1 word)

3.2.4.9 DEK Mark Display Process

The DEK Mark DISP provides the capability to add a symbol to a specified line on the IMK or MPD indicating required action, and to delete the symbol when the action has been completed.

The symbol may be a "d" on the IMK to denote required DEK input, which is then removed when valid DEK input is entered. The symbol may be a " $\checkmark$ " on the MPD to denote a checked off item or a " $\leftarrow$ " to denote the next item in a checkoff sequence.

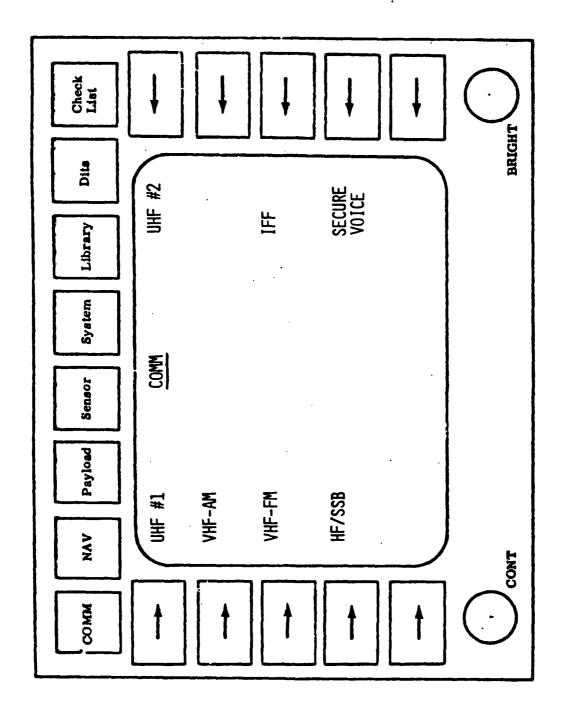


FIGURE 3.2-7 SAMPLE IMK FIXED - TEXT DISPLAY

It is usually activated by the IMK or MPD Handler Specialist Function to control the symbol display. It is sometimes activated by a Tailored Mode SPEC which determines the successful completion of a data entry.

#### 3.2.4.9.1 Inputs

Input shall consist of:

- o device number (1 word)
- o action insert, delete (1 word)
- o CRT row, column (1 word)

# 3.2.4.9.2 Processing

Given the device and requested action, the DEK Mark DISP shall store the appropriate message in a Compool to be sent to the A/NSG or MPDG.

### 3.2.4.9.3 Outputs

Output shall consist of the A/NSG or MPDG message:

- o control message (1 word)
- 3.2.4.10 IMK Status Display Process

The IMK Status DISP controls the display of status information in the center partition of the IMK. It is activated once per second to update parameter status if there is an active display. Figure 3.2-8 shows a sample IMK status display.

### 3.2.4.10.1 Inputs

Input shall consist of the status display ID:

- o display number (1 word)
- 3.2.4.10.2 Processing

The IMK Status DISP shall access a table which identifies the parameters for the display number. Current status for these parameters shall be obtained from a Compool, formatted and stored in an output buffer for transfer to the A/NSG.

# 3.2.4.10.3 Outputs

Output shall consist of the A/NSG buffer:

o parameter status (n words)

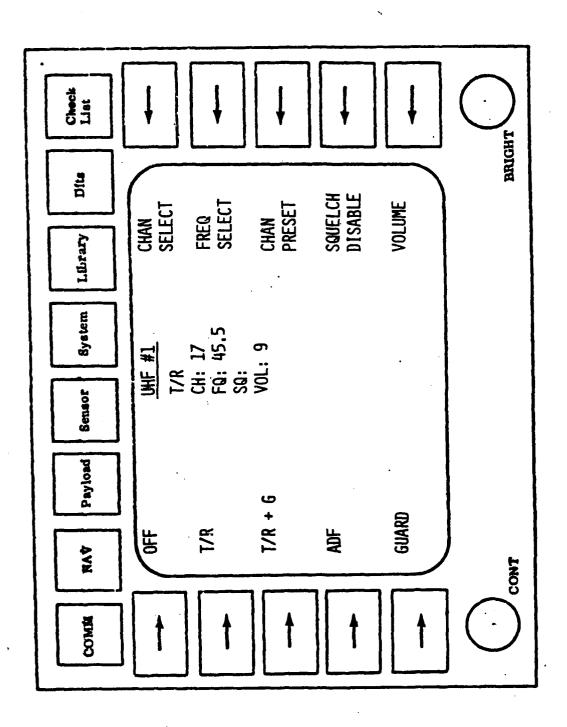


FIGURE 3.2-8 SAMPLE IMK STATUS DISPLAY

# 3.2.5 Equipment Processes

The Applications Software interfaces with IDAMST equipment via Equipment Processes (EQUIPS).

For each sensor providing data to the Application Software, the corresponding input EQUIP will:

- monitor equipment status and initiate action when a health problem or degraded data is detected
- o perform the processing required to make the parameter(s) available for use by Applications Software tasks
- o generate substitute data values if necessary

Those EQUIPS which output control data to equipment will:

o perform the processing required to format the appropriate control message

The Equipment Processes identified for IDAMST are shown in Table 3.2-4.

# 3.2.5.1 UHF-AM Equipment Process

The two UHF-AM radios (AN/ARC-164) are used for military communications and as backup ADF receivers. They provide short-range, line-of-sight, two-way simplex voice communication with ground systems and other aircraft, operating in the 225-399.95 mHz frequency band. When the radio is in backup ADF mode, bearing is obtained via the ADF EQUIP.

The UHF EQUIP is activated by the UHF-AM Tailored Mode SPEC whenever a formatted control message is to be sent to the radio.

## 3.2.5.1.1 Inputs

Input shall be a message containing radio ID and desired control:

o radio ID, control input (2 words)

Control capability consists of one of the following:

- o frequency channel pre-set, alligning frequency tuning by channel select
- o manual frequency selection
- o pre-set guard frequency selection
- o operational mode selction (T/R, TR+G, ADF, OFF)

TABLE 3.2-4 EQUIP SUMMARY

Equipment	Activation Rate (per second)	
DEK	8*	(Input)
TACAN	8	(Input)
HCU	16*	(Input)
OMEGA	8	(Input)
FCS	32	(Input)
G-Meter	4	(Input)
INS	4	(Input)
SKE/ZM	4	(Input)
LF/ADF	4	(Input)
UHF/ADF	4	(Input)
Radar ALT	4	(Input)
ILS	4	(Input)
Compass	4	(Input)
Flight Surfaces	2	(Input)
Aircraft Systems	2	(Input)
Caut/Brakes/Gear	2	(Input)
UHF-AM	Demand	(Output)
VHF-AM	Demand	(Output)
VHF-FM	Demand	(Output)
HB/SSB	Demand	(Output)
DSMU	Demand	(Output)
Secure Voice	Demand	(Output)
TACAN	Demand	(Output)
OMEGA	Demand	(Output)
CCA	Demand	(Output)
FCS	16	(Output)
Flares	Demand	(Output)
INS	Demand	(Output)
SKE/ZM	Demand	(Output)
LF/ADF	Demand	(Output)
UHF/ADF	Demand	(Output)
Radar ALT	Demand	(Output)
ILS	Demand	(Output)
Compass	Demand	(Output)
Radar	Demand	(Output)
IRD&W	Demand	(Output)
RHAWS	Demand	(Output)
Avionics On/Off	Demand	(Output)
ICS	8	(Input/Output)
P.A.	8	(Input/Output)
FDR	TBD	(Output)
I UK	100	(ouchac)

<sup>\*</sup> Continuous activation only when being used.

- o squelch disable
- o volume control

#### 3.2.5.1.2 Processing

When activated by the UHF-AM Tailored Mode SPEC, the EQUIP shall determine the type of control desired, format the required message, and store it in a compool for subsequent transfer to the radio. Input control data will have been checked by the activating task for invalid/out-of-range conditions, sc EQUIP processing shall assume valid data.

#### 3.2.5.1.3 Outputs

Output shall be control messages corresponding to the request, and status updates:

- o control command (1 word)
- o status update (1 word)

## 3.2.5.2 VHF-AM Equipment Process

The VHF-AM radio (Wilcox-807A) is used for CCT and civilian communications. It provides two-way simplex 160 nautical mile voice communication in the 118 - 135.975 mHz frequency band over line-of-site propagation paths.

The VHF-AM EQUIP is activated by the VHF-AM Tailored Mode SPEC whenever a formatted control message is to be sent to the radio.

3.2.5.2.1

Input shall be a message containing the desired control:

o control input (1 word)

Control capability consists of one of the following:

- o manual frequency selection
- o squelch disable
- o volume control
- o on/off control

#### 3.2.5.2.2 Processing

When activated by the VHF-AM Tailored Mode SPEC, the EQUIP shall determine the type of control desired, format the required message, and store it in a compool for subsequent transfer to the radio. Input control data will have been checked by the activating task for invalid/out-of-range conditions, so EQUIP processing shall assume valid data.

# 3.2.5.2.3 Outputs

Output shall be control messages corresponding to the request, and status updates:

- o control command (1 word)
- o status update (1 word)

# 3.2.5.3 VHF-FM Equipment Process

The VHF-FM radio (FM622A) is used primarily for military/CCT communications. It provides short-range line-of-sight, two-way simplex voice communication in the 30 - 75.95 mHz frequency range.

The VHF-FM EQUIP is activated by the VHF-FM Tailored Mode SPEC whenever a formatted control message is to be sent to the radio.

#### 3.2.5.3.1

Input shall be a message containing the desired control:

o control input (1 word)

Control capability consists of one of the following:

- o on/off control
- o manual frequency selection
- o volume control
- o T/R control
- o re-transmit control
- o home control
- o squelch disable
- o squelch carrier
- o squelch tone

#### 3.2.5.3.2 Processing

When activated by the VHF-FM Tailored Mode SPEC, the EQUIP shall determine the type of control desired, format the required message, and store it in a compool for subsequent transfer to the radio. Input control data will have been checked by the activating task for invalid/out-of-range conditions, so EQUIP processing shall assume valid data.

### 3.2.5.3.3 Outputs

Output shall be control messages corresponding to the request, and status updates:

- o control command (1 word)
- o status update (1 word)

# 3.2.5.4 HF/SSB Equipment Process

The HF/SSB radio (AN/ARC-123) is used for long-range military communications. It provides two-way simplex voice communications at distances up to 2,500 nautical miles, operating in the 2-30 mHz frequency band.

The HF/SSB EQUIP is activated by the HF/SSB Tailored Mode SPEC whenever a formatted control message is to be sent to the radio.

### 3.2.5.4.1

Input shall be a message containing the desired control:

o control input (1 word)

Control capability consists of one of the following:

- o on/off control
- o manual frequency selection
- o SSB
- o amplitude modulation equivalent
- o frequency shift key
- o continuous wave
- o volume control
- o squelch disable
- o noise blank
- o RF gain control

#### 3.2.5.4.2 Processing

When activated by the HF/SSB Tailored Mode SPEC, the EQUIP shall determine the type of control desired, format the required message, and store it in a compool for subsequent transfer to the radio. Input control data will have been checked by the activating task for invalid/out-of-range conditions, so EQUIP processing shall assume valid data.

# 3.2.5.4.3 Outputs

Output shall be control messages corresponding to the request, and status updates:

- o control command (1 word)
- o status update (1 word)

### 3.2.5.5 ICS Equipment Process

The Intercommunication Set (AN/AIC-18) provides:

- o two-way voice communication between crew stations
- o interfaces with radio tranceivers, navigation receivers, public address amplifier, and maintenance intercom outlets

The ICS allows for selection, control, and distribution of radio systems for airborne/ground station communication and monitoring.

The ICS EQUIP is activated cyclically eight times per second from startup.

#### 3.2.5.5.1 Inputs

Input shall be ICS control panel ID and settings, and hot-mic select from the CCA:

- o hot-mic selection (CCA) (1 word)
- o monitoring (mixer) switches with individual volume controls (n words)
- o hot-listen selection (1 word)
- o mic-talk selection (panel) (1 word)
- o call selection (1 word)
- o aux listen selection (1 word)

#### 3.2.5.5.2 Processing

The EQUIP shall determine if panel setting has changed since the last activation. If the settings are the same, the EQUIP shall terminate. If changed, the EQUIP shall format/store corresponding ICS control messages.

# 3.2.5.5.3 Outputs

Output shall be control messages corresponding to the request, and status updates:

- o control command (1 word)
- o status update (1 word)
- 3.2.5.6 Public Address Equipment Process
- The P.A. System (AN/AIC-13) is used for voice announcements in the cargo areas.
- The P.A. EQUIP is activated cyclically eight times per second from startup.
- 3.2.5.6.1 Inputs

Input shall be the P.A. control panel output buffer to be monitored by the EQUIP:

- o on/off control
- o speaker selection
- o mixer switch control
- o volume control
- 3.2.5.6.2 Processing

The EQUIP shall determine if panel setting has changed since the last activation. If the settings are the same, the EQUIP shall terminate. If changed, the EQUIP shall format/store corresponding P.A. control messages.

3.2.5.6.3 Outputs

Output shall be control messages corresponding to the request, and P.A. status updates:

- o control command (1 word)
- o status update (1 word)
- 3.2.5.7 Secure Voice Equipment Process

The Secure Voice System (TSEC/KY-58) encrypts and decrypts VHF/UHF voice communication.

The secure voice EQUIP is activated by the Secure Voice Tailored Mode SPEC whenever on/off control is to be sent to the unit.

3.2.5.7.1 Input

Input shall be a message containing desired control:

o on/off indication (1 word)

#### 3.2.5.7.2 Processing

This EQUIP shall store the on (or off) control message in a compool for subsequent transfer to the unit.

## 3.2.5.7.3 Outputs

Output shall be control messages corresponding to the request, and status updates:

- o control command (1 word)
- o status update (1 word)

# 3.2.5.8 DEK Equipment Process

The DEK Equipment Process controls the DEK input procedure. An eight-timesper-second activation rate is initiated by a Handler Specialist Function whenever DEK input is required for a particular IMK side key function or MPD checklist function. It is deactivated when an ENTER is received or when there is no further need for the input.

# 3.2.5.8.1 Inputs

Input shall be one character:

o character (1 word)

which may represent any of the following:

- o digits 0 through 9
- o CLEAR (re-set)
- o CHECK (checklist checkoff MPD)
- o SPACE (checklist skip function MPD)
- o PAGE (advance page MPD)
- o ENTER (end-of-data)
- o NULL (no input)

#### 3.2.5.8.2 Processing

When activated, the DEK EQUIP shall initialize the input buffer. Each activation thereafter (eight/second) the EQUIP shall determine input status, and terminate if there was no input since the last activation.

If the input was a 0 - 9 digit (or its upper case equivalent), and the input buffer isn't full, the character shall be stored; otherwise, the buffer shall

be cleared and a message displayed on the center MPD via the Error/Warning DISP. The maximum size of the input buffer is 20 characters.

If the input is CLEAR, the EQUIP shall clear the buffer.

CHECK, SPACE, PAGE are used for MPD checklist functions; the MPD Handler Specialist Function is activated to control the processing of the input buffer. If the DEK EQUIP is assigned to an IMK Handler, these keys shall be ignored.

ENTER indicates the end of the input data string; the Handler Specialist Function shall be activated to process the input buffer.

3.2.5.8.3 Outputs

Output shall be the final DEK input buffer:

o input buffer (1 - n word)

packed two characters per word.

3.2.5.9 DSMU Equipment Process

The DSMU controls display distribution and refresh functions. It contains modules which provide five independent raster memory channels to refresh the MPD's, and two independent stroke channels for the HUD's. The display memory is loaded/updated from the MPDG. Switching commands allow sensor video to be displayed in lieu of a display stored in a memory module.

The DSMU EQUIP is activated by the DSMU Tailored Mode SPEC whenever a switching command is to be sent to the DSMU as a result of a crew request via the IMK.

3.2.5.9.1 Inputs

Input shall consist of

o DSMU switching request (1 word)

3.2.5.9.2 Processing

The DSMU EQUIP shall format the switching command and store in an output buffer for transfer to the DSMU.

3.2 5.9.3 Outputs

Output shall consist of

- o DSMU switching command (1 word)
- o Switching status (1 word)

# 3.2.5.10 TACAN Equipment Processes

The TACAN System (AN/ARN-118) furnishes data relative to a selected TACAN facility operating in the 962 - 1213 mHz frequency band.

Two TACAN EQUIPS are provided. The input EQUIP is activated cyclically to receive data; the output EQUIP formats TACAN commands to satisfy control requests.

### 3.2.5.10.1 TACAN Input EQUIP

This EQUIP processes data from the TACAN system. It is activated eight times  $\operatorname{\mathsf{per}}$  second.

# 3.2.5.10.1.1 Inputs

Input shall be TACAN data and previous status:

- o bearing (1 word)
- o range (1 word)
- o range rate, to-from indication (1 word)
- o status (1 word)
- o previous status (1 word)

# 3.2.5.10.1.2 Processing

The input EQUIP shall format and scale the data as necessary, and store the results in a compool. If status has changed, the SSSM shall be activated.

#### 3.2.5.10.1.3 Outputs

Output shall be the formatted data:

- o bearing (1 word)
- o distance (1 word)
- o range rate (1 word)
- o to-from indicator (1 word)
- o commse deviation signal (1 word)

# 3.2.5.10.2 TACAN Output EQUIP

This EQUIP formats control messages to the TACAN. It is activated by the TACAN Tailored Mode SPEC whenever control is requested by a crew member via the IMK.

#### 3.2.5.10.2.1 Inputs

Input shall be control type/value data:

- o on/off
- o channel select
- o mode select
  - o receive
  - o transmit/receive
  - o A/A receive
  - o A/A transmit
- o auto/manual tuning
- o volume
- o course select
- o test capability

# 3.2.5.10.2.2 Processing

The input EQUIP shall generate the control message corresponding to the type/value input data.

3.2.5.10.2.3 Outputs

Output shall be the control message and status:

- o TACAN control (1 word)
- o Control status update (I word)

#### 3.2 5.11 HCU Equipment Process

The Hand Controller Unit provides crew memebers with: 1) the capability to point the radar antenna and 2) data update capability via display cursor positioning.

The HCU EQUIP is activated 16 times per second (whenever an HCU display-select pushbutton is in effect) to process cursor displacements.

3.2.5.11.1 Inputs

Input shall be activate/designate pushbutton and X, Y displacement:

- o pushbutton (1 word)
- o  $\triangle X, \triangle Y$  (2 words)

3.2.5.11.2 Processing

The HCU EQUIP shall keep track of the "null", "activate", or "designate" state of the controller pushbutton. The state is initially "null". No calculations are performed until the controller pushbutton is pressed for the first time, changing the state to "activate".

When the state is "activate", the EQUIP shall evaluate the effective cursor position with respect to the selected display, and store these displacements for use by the particular DISP that is to use them. If the antenna control pushbutton is active, and the displacements represent a change from the previous, the Radar Tailored Mode SPEC shall be activated.

When the controller pushbutton is pressed a second time, the state changes to "designate" and no further calculations are performed; the last calculated displacement is left in a compool to be used, for example, in a navigation data update procedure.

3.2.5.11.3 Outputs

Output shall consist of displacement data and pushbutton state:

o  $\triangle X, \triangle Y$  (2 words)

o state - null, activate, designate (1 word)

3.2.5.12 OMEGA Equipment Processes

The OMEGA Radio Navigation System (AN/ARN- ) provides airplane position fixes using the worldwide network of VLF ground transmitters.

Two OMEGA EQUIPS are provided. The input EQUIP is activated cyclically to receive data; the output EQUIP formats OMEGA commands to satisfy control requests.

3.2.5.12.1 OMEGA Input EQUIP

This EQUIP processes data from the OMEGA system. It is activated eight times per second.

3.2.5.12.1.1 Inputs

Input shall consist of:

o three channels of RF information

3.2.5.12.1.2 Processing

The OMEGA input EQUIP shall format/scale RF data

as

necessary, and store in a compool for use in navigation calculations.

3.2.5.12.1.3 Outputs

Output shall be the OMEGA parameters, properly formatted and scaled, to be stored in a compool:

- o parameters (n words)
- 3.2.5.12.2 OMEGA Output EQUIP

This EQUIP formats control messages to the OMEGA system. It is activated by the OMEGA Tailored Mode SPEC whenever control is requested by a crew member via the IMK.

3.2.5.12.2.1 Inputs

Input shall consist of

- o On/Off (1 word)
- o Auto/Manual Tuning (1 word)
- o GMT, Date, Latitude, Longitude (4 words)

### 3.2.5.12.2.2 Processing

The output EQUIP shall generate the control message corresponding to the type/value input data.

3.2.5.12.2.3 Outputs

Output shall be the control message and status.

- o OMEGA Control (1 word)
- o Status Update (1 word)

3.2.5.13 CCA Equipment Process

The Column Control Assembly provides a shaker capability for imminent stall conditions.

The CCA EQUIP is activated by the FCS EQUIP whenever shaker control (on or off) is required.

3.2.5.13.1 Inputs

Input shall consist of

- o Shaker Control Request
- **3.2.5.13.2** Processing

The CCA EQUIP shall store the control message in a Compool for subsequent transfer to the CCA, and update the CCA status accordingly.

3.2.5.13.3 Outputs

Output shall be control commands and status updates.

- o CCA Shaker On/Off Control (1 word)
- o On/Off Status (1 word)
- 3.2.5.14 FCS Equipment Process

The Flight Control System provides air data, attitude, and mode and status information. This information is processed by the avionics system to provide steering data for the flight control system.

Two FCS EQUIP's are provided. The input EQUIP is activated cyclically to receive data; the output EQUIP is activated cyclically to send steering data.

### 3.2.5.14.1 FCS Input EQUIP

The FCS input EQUIP processes data from the flight control system. It is activated 32 times per second.

#### 3.2.5.14.1.1 Inputs

Input shall be FCS output data, and previous status.

- o Air Data (10 words), 3 channels
- o Attitude (5 words), 3 channels
- o Mode and Status (1 word), 3 channels
- o Previous Status (1 word)

#### 3.2.4.14.1.2 Processing

The Equip shall process the data as necessary, and store the results in a Compool. If the status has changed, the SSSM shall be activated. The LIGHTS DISP shall be activated for on/off control of the EFCS Warning Light, as necessary.

Data processing may include scaling, signal source selection, smoothing, algorithm calculations, etc.

# 3.2.5.14.1.3 Outputs

Output shall consist of

- o Air Data (10 words)
- o Attitude Data (5 words)
- o Mode/Status (1 word)
- o EFCS Light Control (1 word)

#### 3.2.5.14.2 FCS Output EQUIP

The FCS Output EQUIP controls the sending of steering signals to the FCS. It is activated cyclically 16 times per second.

# 3.2.5.14.2.1 Inputs

Input shall consist of

o Steering Requests (4 words)

# 3.2.5.14.2.2 Processing

The output EQUIP shall generate the steering messages and outputs them to a Compool.

3.2.5.14.2.3 Outputs

Output shall consist of

- o Steering Signals (4 words)
- 3.2.5.15 Flares Dispenser System Equipment Process

The Flares Dispenser System contains four sets of flares which may be dropped as a defensive measure against infrared seeker threats.

The Flares Dispenser System EQUIP is activated by the Flares Dispenser tailored Model SPEC whenever a formatted control message is to be sent to the system.

3.2.5.15.1 Inputs

Input shall be control requests and status.

- o On/Off (1 word)
- o Flare Set # (1 word)
- o Flare Status (2 words)
- 3.2.5.15.2 Processing

The Flares Dispensar System EQUIP shall generate control messages and store them in a Compool for transmission. The software flare status shall be updated.

3.2.5.15.3 Outputs

Output shall be control commands to the Flares Dispenser System and status.

- o On/Off Command (1 word)
- o Flare Drop Command (1 word)
- o Current Flare Status (2 words)
- 3.2.5.16 G-Meter Equipment Process

The G-Meter displays 1) current vertical acceleration, 2) the low vertical acceleration since last reset, and 3) the high vertical acceleration since last reset.

The G-Meter EQUIP is activated 4 times per second to monitor the reset button.

3.2.5.16.1 Inputs

Input shall consist of

o Reset Button Status (1 word)

# 3.2.5.16.2 Processing

If the reset button shows a change in status, the low vertical acceleration and high vertical acceleration shall be set equal to 1.

3.2.5.16.3 Output

Output shall be new low and high vertical acceleration values.

o Accelerations (2 words)

3.2.5.17 INS Equipment Processes

The INS (Carousel IV) is a self-contained inertial navigation system (including a digital computer) which provides worldwide aircraft navigation entirely independent of ground communication.

Two INS EQUIP's are provided. The input EQUIP is activated cyclically to receive data; the output EQUIP formats INS commands to satisfy control requests.

3.2.5.17.1 INS Input EQUIP

This EQUIP processes data from the INS. It is activated 4 times per second.

3.1.5.17.1.1 Inputs

Input shall consist of

- Aircraft Position and Velocity (6 words)
- o Pitch and Roll (2 words)
- o Calculated Digital Data ( n words)
- o Status (1 word)

#### 3.2.5.17.1.2 Processing

The EQUIP shall format and scale the data as necessary, and store the results in a Compool. If the status has changed, the SSSM shall be activated.

3.2.5.17.1.3 Outputs

Output shall consist of

- o Position and Velocity (2 words)
- o Pitch and Roll (2 words)
- o Other Data (n words)

### 3.2.5.17.2 INS Output EQUIP

This EQUIP formats control messages to the INS. It is activated by the INS Tailored Mode SPEC whenever control is requested by a crew member via the IMK.

3.2.5.17.2.1 Inputs

Input shall consist of

- o Mode (1 word)
- o Auto/Manual Select (1 word)
- o Initial Position (2 words)
- o Way Point Loading (n words)

3.2.5.17.2.2 Processing

The EQUIP shall generate the control message corresponding to the type/value input data.

3.2.5.17.2.2. Outputs

Output shall be the control message and updated control status:

o INS Control (1 word) and Status (1 word)

3.2.5.18 SKE/ZM Equipment Processes

The Station Keeping Equipment (AN/APN-169) is a cooperative air-to-air station keeping system for flights of up to 36 aircraft. It enables these aircraft to locate and identify one another; and to maintain formation/rendezvous regardless of visibility. The SKE interfaces with the MDSC to provide a formation display.

Two SKE EQUIP's are provided. The input EQUIP is activated cyclically to receive data; the output EQUIP formats SKE commands to satisfy control requests.

3.2.5.18.1 SKE Input EQUIP

This EQUIP processes data from the SKE. It is activated 4 times per second.

3.2.5.18.1.1 Inputs

Imput shall consist of

- o Aircraft Range and Bearing (n words)
- o SKE Status (1 word)

3.2.5.18.1.2 Processing

The EQUIP shall format and scale the data as necessary, and store the results in a Compocl. If the status has changed, the SSSM shall be activated.

3.2.5.18.1.3 Outputs

Output shall consist of

o Aircraft Range and Bearing (n words)

## 3.2.5.18.2 SKE Output EQUIP

This EQUIP formats control messages to the SKE. It is activated whenever control is requested by a crew member via the IMK.

# 3.2.5.18.2.1 Inputs

Input shall be control type/value data:

- o 0n/0ff (1 word)
- o Freq A/B (1 word)
- o In Track Offset (1 word) o Altitude Offset (1 word)
- o Cross-Track Offset (1 word)
- o Leader Select (1 word)
- o Proximity Warning Range (1 word)
- o Proximity Warning Tone On/Off (1 word)
- o Master-Follow Select (1 word)
- o Master Indicator (1 word) o BITE Test (1 word)
- o ID Function Select (1 word)
- o Range Scale (1 word)
- o Range Mark (1 word)
- o Display Centering (1 word)
- o Blanking (1 word)

## 3 2.5.18.2.2 Processing

The EQUIP shall generate the control message corresponding to the type/ value of the input request.

#### 3.2.5.18.2.3 Outputs

Output shall be the control message and updated control status.

o SKE Command (1 word) and Status (1 word)

#### 3.2.5.19 LF/ADF Equipment Processes

The LF/ADF (DF-206) provides the navigation calculation with bearing to a selected low frequency radio station.

Two LF/ADF EQUIP's are provided. The input EQUIP is activated cyclically to receive data; the output EQUIP formats LF/ADF commands to satisfy control requests.

#### 3.2.5.19.1 LF/ADF Input EQUIP

This EQUIP processes data from the LF/ADF unit. It is activated four times per second.

3.2.5.19.1.1 Inputs

Input shall consist of

- o Bearing (1 word)
- o Status (1 word)

3.2.5.19.1.2 Processing

The input EQUIP shall format and scale the bearing input data, and store it in a Compool. If the status has changed, the SSSM shall be activated.

3.2.5.19.1.3 Outputs

Output shall consist of

o Bearing (1 word)

3.2.5.19.2 LF/ADF Output EQUIP

This EQUIP formats control messages to the LF/ADF. It is activated whenever control is requested by a crew member via the IMK.

3.2.5.19.2.1 Inputs

Input shall be control type/value data.

- o On/Off (1 word)
- o Auto/Manual Select (1 word)
- o Frequency Select (1 word)
- o Test Select (1 word)
- o Volume (1 word)

3.2.5.19.2.2 Processing

The output EQUIP shall generate the control message corresponding to the type/value of the input request.

3.2.5.19.2.3 Outputs

Output shall be the control message and updated control status.

o LF/ADF Command (1 word) and Status (1 word)

3.2.5.20 UHF/ADF Equipment Processes

The UHF/ADF (DF-301E) provides the navigation calculation with bearing to a selected ultra-high frequency radio station.

Two UHF/ADF EQUIP's are provided. The input EQUIP is activated cyclically to receive data; the output EQUIP formats UHF/ADF commands to satisfy control requests.

3.2.5.20.1 UHF/ADF Input EQUIP

This EQUIP processes data from the UHF/ADF unit. It is activated four times per second.

3.2.5.20.1.1 Inputs

Input shall consist of

- o Bearing (1 word)
- o Status (1 word)

3.2.5.20.1.2 Processing

The input EQUIP shall format and scale the bearing input data, and store it in a Compool. If status has changed, the SSSM shall be activated.

3.2.5.20.1.3 Outputs

Output shall consist of

o Bearing (1 word)

3.2.5.20.2 UHF/ADF Output EQUIP

This EQUIP formats control messages to the UHF/ADF. It is activated whenever control is requested by a crew member via the IMK.

3.2.5.20.2.1 Inputs

Input shall be control type/value data.

- o On/Off (1 word)
- o Auto/Manual Select (1 word)
- o Frequency Select (1 word)
- o Test Select (1 word)
- o Volume (1 word)

3.2.5.20.2.2 Processing

The output EQUIP shall generate the control message corresponding to the type/value of the input request.

3.2.5.20.2.3 Outputs

Output shall be the control message and updated control status.

- o UHF/ADF Command (1 word) and Status (1 word)
- 3.2.5.21 Radar Altimeter Equipment Processes

The two Radar Altimeters (AN/APN-194) are range tracking radars which provide altitude information from 0-5000 feet.

Two Radar Altimeter EQUIPS are provided. The input EQUIP is activated cyclically to receive data; the output EQUIP formats Radar Altimeter commands to satisfy control requests.

3.2.5.21.1 Radar Altimeter Input EQUIP

This EQUIP processes data from the Radar Altimeter. It is activated four times per second.

3.2.5.21.1.1 Inputs

Input shall consist of

- o Status (1 word)
- o Altitude (1 word)
- o Radar altimeter ID (1 word)

# 3.2.5.21.1.2 Processing

The input EQUIP shall format and scale the altitude input data, and store it in a Compool. If the status has changed, the SSSM shall be activated.

3.2.5.21.1.3 Outputs

# Output shall consist of

- o Altitude (1 word)
- 3.2.5.21.2 Radar Altimeter Output EQUIP

This EQUIP formats control messages to the Radar Altimeter. It is activated whenever control is requested by a crew member via the IMK.

3.2.5.21.2.1 Inputs

Input shall consist of

- o On/off (1 word)
- o Low altitude select (1 word)
- o ID (1 word)
- o Test select (1 word)

# 3.2.5.21.2.2 Processing

The output EQUIP shall generate the control message corresponding to the type/value of the input request, and store it in a Compool.

3.2.5.21.2.3 Outputs

# Output shall consist of

o radar altimeter command (1 word)

# 3.2.5.22 ILS Equipment Processes

The Instrument Landing System (AN/ARN-108) is used in conjunction with ground transmitting equipment and airplane flight director calculations to provide display capability for marker beacon, glideslope, and localizer signals.

Two ILS EQUIPS are provided. The input EQUIP is activated cyclically to receive data; the output EQUIP formats ILS commands to satisfy control requests.

# 3.2.5.22.1 ILS Input EQUIP

This EQUIP processes data from the ILS unit. It is activated four times per second.

### 3.2.5.22.1.1 Inputs

# Input shall consist of

- o Bearing (1 word)
- o Status (1 word)
- o Localizer/glide slope deviation (2 words)
- o ILS ID (1 word)

# 3.2.5.22.1.2 Processing

The EQUIP shall format and scale the bearing data, and store it in a Compool. If the status has changed, the SSSM shall be activated.

# 3.2.5.22.1.3 Outputs

# Output shall consist of

- o Bearing (1 word)
- 1 Localizer/glide slope deviations (2 words)

#### 3.2.5.22.3 ILS Output EQUIP

This EQUIP formats control messages to the ILS. It is activated whenever control is requested by a crew member via the IMK.

#### 3.2.5.22.2.1 Inputs

# Input shall consist of

- o On/off (1 word)
- o Auto/manual select (1 word)
- o Frequency select (1 word)
- o Course select
- o MDA select
- o ILS ID

3.2.5.22.2.2 Processing

The EQUIP shall generate the control message corresponding to the type/value of the input request.

3.2.5.22.2.3 Outputs

Output shall consist of

o ILS command (1 word) and Status (1 word)

3.2.5.23 Compass Equipment Processes

The Magnetic Compass (C-12) provides heading information for navigation.

Two Compass EQUIPs are provided. The input EQUIP is activated cyclically to receive data; the output EQUIP formats Compass Commands to satisfy control requests.

3.2.5.23.1 Compass Input EQUIP

This EQUIP processes data from the Compass unit. It is activated four times per second.

3.2.5.23.1.1 Inputs

Input shall consist of

- Heading (1 word)
- 5 Status (1 word)

3.2.5.23.1.2 Processing

The input EOUIP shall format and scale the heading data, and store it in a Compool. If the status has changed, the SSSM shall be activated.

3.2.5.23.1.3 Outputs

Output shall consist of

- O Heading (1 word)
- 3.2.5.23.2 Compass Output EQUIP

This EQUIP formats control messages to the Compass. It is activated whenever control is requested by a crew member via the IMK.

5.2.5.23.2.1 Inputs

Input shall consist of

- On/off (1 word)
- o Slaved option (1 word)
- o D.G. (1 word)
- o Set heading (1 word)
- Set latitude (1 word)

#### 3.2.5.23.2.2 Processing

The output EQUIP shall generate the control message corresponding to the type/value of the input request.

3.2.5.23.2.3 Outputs

Output shall consist of

- o Compass command (1 word)
- o Status (1 word)

3.2.5.24 LR Radar Equipment Processes

The Long Range Radar (AN/APQ-122) provides precise navigation capabilities for long-range ground mapping, weather detection, and beacon interrogation. A high-resolution CRT radar display is available to the crew upon request.

The Radar EQUIP is activated by the Radar Tailored Mode SPEC whenever a formatted control message is to be sent to the unit.

3.2.5.24.1 Inputs

Input shall consist of

- o Mode select (1 word)
- Frequency select (1 word)
- Magnetic variation select (1 word)
- RF power, gain (2 words)
- Beam (1 word)
- Azimuth stabilizer (1 word)
- ISO echo (1 word)
- Scan select (1 word) Range select (1 word)
- Fast time on/off (1 word)
- Sens. time (1 word)
- Frequency agile mode on/off (1 word)
- Heading marker intensity (1 word)
- Range marker intensity (1 word)
- Sweep intensity (1 word)

#### 3.2.5.24.2 Processing

The EQUIP shall generate the control message corresponding to the type/ value of the input request, and store it in a Compool for subsequent transmission to the Long Range Radar.

3.2.5.24.3 Outputs

Output shall consist of

o Radar command (1 word) and status (1 word)

3.2.5.25 IRD&W Equipment Processes

The Infrared Detection and Warning System is a defensive countermeasure which provides threat information. It interfaces with the MDSC to provide a quadrant-orientated threat display.

The IRDW EQUIP is activated by the IRDW Tailored Mode SPEC whenever a formatted control message is to be sent to the unit.

3.2.5.25.1 Inputs

Input shall consist of

o on/off (1 word)

3.2.5.25.2 Processing

The EQUIP shall store the on (or off) control message in a Compool for subsequent transfer to the device.

3.2.5.25.3 Outputs

Output shall consist of

o on/off command

3.2.5.26 RHAWS Equipment Process

The Radar Homing and Warning System (AN/APR~36/37) is a radar-detecting, defensive countermeasure which provides threat information to the crew via MPD display.

The RHAWS EQUIP is activated by the RHAWS Tailored Mode SPEC whenever a formatted control message is to be sent to the unit.

3.2 5.26.1 Inputs

Input shall consist of

o on/off (1 word)

3.2.5.26.2 Processing

The EQUIP shall store the on (or off) control message in a Compool for subsequent transfer to the device.

3.2.5.26.2 Processing

The EQUIP shall store the on (or off) control message in a Compool for subsequent transfer to the device.

3.2.5.26.3 Outputs

Output shall consist of

o On/Off Command (1 word)

3.2.5.27 Flight Surfaces Equipment Process

The current positions of controllable flight surfaces (e.g., flaps) are monitored for display and algorithm purposes.

The Flight Surfaces EQUIP is activated 2 times per second to read current position settings of the surfaces.

3.2.5.27.1 Inputs

Input shall consist of

- o Elevator Trim Positions (9 words)
- o Left-Wing Flap/Spoiler Positions (7 words)
- o Right Wing Flaps/Spoiler Positions (7 words)

3.2.5.27.2 Processing

The EQUIP shall process the input data as required, and store the result in a Compool.

3.2.5.27.3 Outputs

Output shall consist of

- o Elevator Trim Positions (9 words)
- o Left Flap Positions (7 words)
- o Right Flap Positions (7 words)

3.2.5.28 Aircraft Sensors Equipment Process

Aircraft sensors provide current status of -

- o Fuel
- o Engines
- o Power
- o Accelerometer

for display.

The Aircraft Sensors EQUIP is activated 2 times a second to read the current sensor output.

3.2.5.28.1 Inputs

Input shall consist of

- o Fuel (n words)
- o Engines (n words)
- o Power (n words)
- o Accelerometer (1 word)

3.2.5.28.2 Processing

The EQUIP shall process the input data as required, and store the results in a Compool.

3.2.5.28.3 Outputs

Output shall consist of

- o Fuel (n words)
- o Engines (n words)
- o Power (n words)
- o Accelerometer (1 word)

3.2.5.29 Brakes/Gear/Caution Equipment Process

The current status of the brake and landing gear systems, and the caution panel, is monitored for display and algorithm purposes.

The Brake/Gear/Caution EQUIP is activated 2 times a second to copy the current status.

3.2.5.29.1 Inputs

Input shall consist of

- o Weight-On-Gear (1 word)
- o Caution Lights (n words)
- o Master Caution Light (1 word)
- o Landing Gear (1 word)
- o Brakes (1 word)
- o Gear-Up and Locked (1 word)
- o Previous Values for the Above (n words)

3.2.5.29.2 Processing

The EQUIP shall process the input data as required, and store the results in a Compool. Changes in the status of any item from its previous value may result in the activation of the Error/Warning DISP.

#### 3.2.5.29.3 Outputs

# Output shall consist of

- o Weight-On-Gear (1 word)
  o Caution Lights (n words)
  o Master Caution Light (1 word)
  o Landing Gear (1 word)
  o Brakes (1 word)

- o Gear-Up and Locked (1 word) o Message ID (1 word)

#### 3.2.5.30 Avionics On/Off Equipment Process

On/off control is provided for the following avionics equipment.

0	Counting Accelerometer	0	HUD 1
0	Gear-Up and Locked - left	0	HUD 2
0	Gear-Up and Locked - right	0	HSD 1
0	Weight on Gear - left	0	HSD 2
0	Weight on Gear - right	0	MPD 1
0	Stick Shaker 1	0	MPD 2
0	Stick Shaker 2	0	MPD 3
0	Stab. Trim Position	0	MPDG 1
0	Flap Position - left	0	MPDG 2
0	Flap Position - right	0	DSMU
0	Fuel Totalizer	0	MDSC
0	Engine 1	0	MFDC
0	Engine 2	0	HCU
0	IRD & W	0	MMK
0	RH & W	0	TACAN
0	Flares Dispenser	0	SKE
0	Long Range Radar	0	HF/SSB Radio
0	Radar Altimeter i	0	VHF-AM Radio
0	Radar 2	0	VHF-FM Radio
0	Magnetic Compass	0	UHF-AM Radio l
0	INS	0	UHF-AM Radio 2
0	OMEGA	0	IFF
0	ILS 1	0	Secure Voice
0	ILS 2	0	Public Address
0	LF ADF	0	Intercommunication Set
0	UHF ADF		

The Avionics On/Off EQUIP is activated by the Avionics On/Off Tailored Mode SPEC whenever On/Off control is requested from the IMK.

#### 3.2.5.30.1 Inputs

# Input shall consist of

- o Equipment ID (1 word)
  o On/Off Control (1 word)

3.2.5.30.2 Processing

The EQUIP shall generate the on (or off) message and store in a Compool for subsequent transfer to the specified device.

3.2.5.30.3 Outputs

Output shall consist of

o On/Off Command (1 word)

3.2.5.31 FDR Equipment Process

The Flight Data Recorder (AN/ASH-31V) is a survivable recorder used for storing a current 30-minute history of voice communications and flight data. A beacon transmitter facilitates recovery after deployment.

The FDR EQUIP in activated cyclically TBD times per second.

3.2.5.31.1 Inputs

Input shall be Compool data to be recorded.

o Data (n words)

3.2.5.31.2 Processing

At each activation, the FDR EQUIP shall format two channels of data and store it in a Compool for transfer to the FDR.

3.2.5.31.3 Outputs

Output shall be data to be sent to FDR.

o Data (n words)

# 3.2.6 Special Requirements

This section contains special requirements imposed on Application Software development.

# 3.2.6.2 JOVIAL J73

All Applications Software will be coded in the JOVIAL J73 higher order language.

# 3.2.6.1 Structured Programming

Top-down, structured programming concepts will be used throughout Applications Software development. Software elements will be established which correspond to functions defined in this document.

## 3.3 Adaptation

This section summarizes the Applications Software requirements with respect to the operating facility, system parameters, and system capacities.

#### 3.3.1 General Environment

Further definition of the IDAMST system design is required prior to completing this portion of the specification. Pending definition the following assumptions are made.

#### 3.3.1.1 IDAMST Core Elements

IDAMST core element hardware including the core element control/displays are assumed to be identical in all AMST aircraft and require no modification or variations in software to adapt the IDAMST OFP and OTP software.

#### 3.3.1.2 Other IDAMST Integrated Hardware

Variations in AMST equipment complement associated with the IDAMST system is expected. It is assumed that the IDAMST OFP and OTP software will be automatically adaptable to hardware variations in the AMST. This will be accomplished through the use of an equipment status word from the IDAMST avionic hardware which identifies the existing hardware configuration. The OFP and OTP software will subsequently adapt to the actual configuration by omitting software functions associated with non-existent avionics hardware elements. The OFP and OTP software will compile a list of active and installed avionic equipment hardware and display list upon command and also write list on DITS recorder for a maintenance record.

## 3.3.2 System Parameters

Constants and other data pertaining to the particular mission must be available at load time for the Application Software to function at full capability.

#### 3.3.3 System Capacities

Estimated capacity requirements of the Applications Software is summarized in Table 3.3-1. These estimates are related to an IDAMST processor like that described in Reference 2.2(c), "Prime Item Product Fabrication Specification for DAIS Processor", and allow a 25% growth margin.

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		Top Level Control Flight & Propulsion Communication Nav. & Guidance Aircraft System Defense		Top Level Control Flight & Propulsion Communication Nav. & Guidance Aircraft System Defense		Top Level Control Flight & Propulsion Nav. & Guidance Aircraft Systems Defense	

TABLE 3.3-1 IDAMST STORAGE/TIMING ESTIMATES

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## 4.0 QUALITY ASSURANCE PROVISIONS

This section identifies the basic method for accomplishing software verification.

#### 4.1 Introduction

IDAMST CPCIs will incorporate top-down, structured concepts, described briefly below:

#### Structured Program

A structured program is a computer program constructed of a basic set of control logic figures which provide at least the following: Sequence of two or more operations, conditional branch to one of two operations and return repetition of an operation. A structured program has only one entry and one exit point. A path will exist from the entry to each node and from each node to the exit. In addition, certain practices are associated, such as indentation of source code to represent logic levels, use of intelligent data names and descriptive commentary.

## Top-Down Programming

Top-down programming is the concept of performing in hierarchical sequence a detailed design, code, integration and test as concurrent operations.

# Top-Down Structured Programs

A top-down structured program is a structured program with the additional characteristics of the source code being logically but not physically segmented in a hierarchical manner and only dependent on code already written. Control of execution between segments is restricted to transfers between vertically adjacent hierarchical segments.

Top-down coding and verification is an ordering of system development which allows for continual integration of the system parts as they are developed and provides for interfaces prior to the parts being developed. At each stage, the code already tested drives the new code, and only external data is required.

In top-down programming, the system is organized into a tree structure of segments. The top segments contain the highest level of control logic and decisions within the program, and either passes control to the next level segments or identifies the next level segments for in-line inclusions. The next level may include stubs. Stubs which are to be replaced eventually with running code may contain a "no operation" instruction or possibly a display statement to the effect that control has been received. The process of replacement of successively lower level stubs with operational code continues until all functions within a system are coded and verified.

In top-down coding and verification, the highest level element is coded first. Coding, checkout, and integration proceed down the hierarchy until the lowest levels have been integrated. This does not imply that all elements at a given level are developed in parallel. Some branches will intentionally be

developed early, e.g., to permit early training and early development of critical functions or hardware/software integration.

Many systems interfaces occur through the data base defintion in addition to calling sequence parameters. Top-down programming requires that sufficient data definition statements be coded and that data records be generated before exercising any segment which references them. Ideally, this leads to a single set of definitions serving all the programs in a given application.

This approach provides the ability to evolve the product in a manner that maintains the characteristic of always being operable, extremely modular and always available for successive levels of testing that accompany the corresponding levels of implementation. Exception to the top-down coding and integration approach will be considered on a case-by-case basis.

Each computer program will be coded in a higher order language. Use of assembly or machine language will be restricted to coding of certain executive functions where the higher order language cannot be used.

#### Real Time Structured Programs

An additional complexity in the IDAMST system is the Real Time, asynchronous communication of structured programs as tasks. Tasks are also organized as a hierarchy. Each task has a Controller Task which is the only task permitted to schedule or cancel the lower level task. However, any task is permitted to activate any other task in IDAMST.

#### 4.2 Computer Program Verification

Computer program verification is the process of determining whether the results of executing a computer program in a test environment agree with the specification requirements. Verification is usually only concerned with the logical correctness of the computer program (i.e., satisfying the functional/performance requirements) and may be a manual or a computer-based process (i.e., testing software by executing it on a computer).

The use of top-down structured programming techniques provide certain program characteristics that may lead to a simplification of the computer program verification process. Top-down integration of the program elements in a CPCI minimizes the use of complex driver routines and replaces them with actual program elements and simple program stubs. It also provides a system in which the computer program is continually being tested as successively lower levels of program elements are integrated and the interfaces between program elements are verified prior to the integration of the next lower level.

#### 4.2.1 Program Element Tests

Program elements are coded in the sequence required for top-down integration. When coding and code review are completed, each program element shall be functionally tested in a stand-alone configuration by the programmer to assure that the element can be executed and that the specified functions are performed. Since program elements are small and are restricted to one entry point and one exit point, the test environment is relatively simple.

## 4.2.2 CPCI Integration Tests

Following successful completion of the Program Element Tests, the program elements are entered into the Computer Program Library where they are subjected to configuration control procedures. Controlled program elements are compiled/assembled, link-edited and the current CPCI version is made available for integration testing. Integration tests are dynamic tests designed to verify program functions and interfaces between program elements and with the data base. The result is a complete CPCI for which all design features have been verified.

The integration of program elements or tasks into the complete computer program shall be accomplished in a top-down sequence. The highest level elements which contain the highest level controller tasks shall be tested and integrated first. These tasks are the Master Sequencer, Configurator, Request Processor, and Subsystem Status Monitor. Testing and integration shall proceed down the hierarchy until all program elements (e.g., equipment interface functions), have been integrated and the design completely verified.

An important aspect of integration testing of IDAMST will be the invocation and synchronization of the tasks, since these functions do not fall under the structured programming rules.

# 4.2.3 Formal Software Testing

The purpose of formal testing is to confirm that the computer program performs the functions and satisfies the performance requirement contained in the software requirements specification. Formal testing consists of Preliminary Qualification Tests (PQT) and Formal Qualification Tests (FQT), and are conducted in accordance with Air Force approved test plans.

# Pre-Qualification Testing (PQT)

PQT is an incremental process which provides visibility and control of the CPC development during the time period between the Critical Design Review and Formal Qualification Testing.

PQT consists of functional level tests, conducted at the development facility, and using Air Force approved test plans. These tests will use documented procedures, completed by the contractor, and submitted to the Air Force Sufficiently in advance of the scheduled test session to permit review and analysis. They will typically use controlled inputs specifically prepared for the test purpose.

A Pre-Qualification test will generally be conducted for each CPCI function. If a test's cost or time consumption estimates are significantly high, the test will be deferred to FQT unless it is time-critical or performance-critical to the development of the CPCI.

# 5.0 PREPARATION FOR DELIVERY

Not applicable.

#### 6.0 NOTES

#### 6.1 Growth Items

The specified growth items were evaluated and the impact to the IDAMST configuration was assessed.

# 6.1.1 Joint Tactical Information Distribution System (JTIDS)

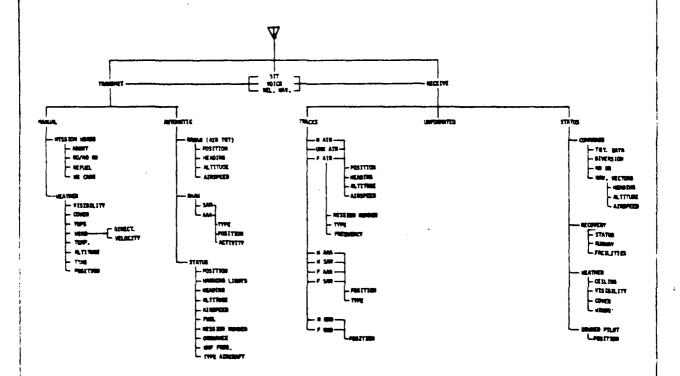
The Joint Tactical Information Distribution System (JTIDS) is a digital, secure, jam-resistant, communication system for real-time command and control of combat operations. JTIDS is planned to interconnect the tactical and air defense elements of all services, including surface and airborne command, control, surveillance and intelligence centers, Navy ships and combat and support aircraft. JTIDS will provide a high degree of interoperability between data collection elements, combat elements and command and control centers within a military theater of operations. Precise signal time-of-arrival measurements, coupled with the transmission of emitter location, are used to generate a common grid coordinate system containing the location of all active net participants. The system uses Time Division Multiple Access (TDMA) to interconnect all system users into one common channel, or network, for distribution of information. Each authorized network element is allocated a dynamic number of transmit time slots within the network reporting cycle as needed for its mission. When not transmitting, each element monitors the transmissions of the other elements and extracts the information as needed. Since the system is nodeless, survivability is enhanced and the system exists as long as two or more elements exist.

The basic JTIDS system for any aircraft will receive, process and display information to the crew and collect, convert and format its own data for broadcast distribution to the net. The baseline JTIDS functions are shown in Figure 6.1-1.

As can be seen from Figure 6.1-1, the two obvious major categories are transmit and receive. Common to both of these functions are the elements of voice, relative navigation and Built-in-Test (BIT). A brief description of the remaining functional elements is contained in the following sections:

<u>Transmit Manual</u>: These are the functions that would require pilot actions in order to initiate transmission. Throughout this study, the functions under this category were deliberately limited due to the constraint of a two-man crew. The only two areas recommended are:

- o Mission Words These elements are to provide key transmissions to command and control agencies. The messages would concern essential mission decisions.
- o Weather This element would allow PIREPS from targets or critical rendezvous areas. The pilot would only initiate inputs for visibility, cloud cover and cloud height. The other elements under this function would automatically be formatted from the navigation computer.



MASELLINE JTIDS TRANSPIT/RECEIVE PLINCTIONS

FIGURE 6.1-1

<u>Transmit Automatic</u>: These are the functions that would be transmitted automatically as long as the system is operating. The major elements are:

- o Radar (Air Target) This transmission would provide the net information on a heretofore unknown hostile aircraft. The message would be sent only after the pilot has locked-on an airborne target that is not being reported on the JTIDS network.
- RHAW Any RHAW threat received that does not correlate with the threat signals being reported on the JTIDS net would constitute a new message to be formatted and transmitted.
- o Status The elements under this function would automatically be transmitted, either continuously or intermittently, as the situation dictates.

Receive Tracks: All hostile, unknown and friendly tracks and positions are grouped under this major function. The elements would be received, stored and formatted for display upon pilot commands.

Receive Status: The functions in this category reflect formatted command messages and information concerning the status and weather of various areas of interest. These elements would also be received, stored and formatted for display upon pilot commands.

<u>Unformatted</u>: This category is for received messages that are free text alphanumeric and meet no structured format. The functional area of these messages cannot be categorized as they are unlimited as to content.

The JTIDS computational requirements were analyzed and assessed as follows:

	words
JTIDS Network Processing	4,250
JTIDS Message Processing	2,925
JTIDS Message Control	1,525
JTIDS Self Test	1,200

Estimated throughput requirements = 110 KOPS.

It is recommended that the JTIDS function be implemented with a dedicated processor because of the computation requirements. Additionally, developmental efforts and interface requirements would be reduced with a dedicated processor.

Assuming a dedicated processor in the JTIDS system, the impact of interfacing JTIDS with the IDAMST system as a growth item is as follows:

- o Data link between JTIDS and IDAMST processors via the multiplexed data bus.
- o IMK and DEK functions will have to be expanded to include JTIDS manual data entry functions.

- o JTIDS display requirements will have to be incorporated into the IDAMST specified displays. Displays requirements fall within three categories: 1) command data; 2) MAP data; and 3) miscellaneous mission data.
- o IDAMST navigation subfunction will have to be modified to utilize the relative navigation capability of the JTIDS system. The accuracy of JTIDS data will be dependent upon the accuracy of the transmitted position and relative navigation calculation. The expected error of the JTIDS mechanization is expected to be insignificant; therefore, JTIDS relative navigation data may be used for updating if JTIDS station positions are accurately known.

## **6.1.2** Terrain Following/Terrain Avoidance (TF/TA)

A limited TF/TA capability is reflected in the ground proximity warning system mechanization which utilizes radar altimeter data and barometric altitude rate. For a truly effective TF/TA system mechanization, a forward looking, TF/TA type radar is required to sense the terrain over which the airplane is expected to fly. Assuming that some type of TF/TA radar would be installed to provide TF/TA capability, the following will be required to integrate TF/TA capability into the IDAMST configuration:

- o TF/TA radar system control panel requirements have to be allocated to IMK functions or dedicated control panels.
- o TF/TA radar display data would be interfaced with the digital scan converter for formatting compatible with IDAMST CRT display devices.
- o Interface between TF/TA radar and avionics system would include stabilization data to TF/TA radar, TF command data for input to the flight director command calculations for display.
- o TF command data to the flight controls would be routed directly to the flight control system to minimize data lag to enable close coupling with the flight control system.

## **6.1.3** Global Positioning System (GPS)

The Global Positioning System (GPS) is a satellite navigation system currently in development by the Department of Defense. In its operational deployment, 24 satellites will be orbited at about 11,000 nautical miles to provide Earth coverage for navigation and weapon delivery. At least six satellites will be in view from any location. The satellites will broadcast their identity, position, and highly accurate time. User equipment will select the four most appropriate satellites and solve four equations in four unknowns to display to the user his position in three dimensions and time.

It is presently anticipated that the GPS will be developed as a TACAN hardware replacement with installation and interface requirements to be compatible with the AN/ARN 118 TACAN set. The GPS system will be self-contained with a dedicated processor in the GPS system. A dedicated processor will minimize GPS developmental activities in individual applications by specifying a standard computer interface. Integrating the GPS into the IDAMST configuration will have the following impact:

- o GPS controls and status will have to be integrated into the IMK functions.
- Data link between GPS and IDAMST processors via the multiplexed data bus. Hardware impact to be minimal if TACAN provisions are utilized.
- o IDAMST navigation subfunction will have to be modified to utilize the GPS data, position and velocity, in determining the aircraft position. The expected accuracy of 100 meters of the low cost GPS will increase the operational capability of the IDAMST configuration.
- o Advanced GPS concepts to provide higher anti-jam capability if required, for the AMST airplane, will increase interface requirements for directional antenna and inertial reference information.

## 10.0 APPENDIX I: HARDWARE/SOFTWARE SIGNAL LIST

The functional interface between avionics hardware and the mission software is defined in terms of a hardware/software interface. The hardware involved in this interface is listed below:

Air/Ground System Approach Indicating System Fire Warning System Automatic Braking System Flight Surfaces Status System Fuel Measurement System Avionics Power Control Logic System **Engine Transducers** Master Caution System Flight Control/Avionics Subsystems Long Range Radar Radar Altimeters Magnetic Compass Inertial Navigation System OMEGA Navigation System Public Address System HF/SSB Radio VHF/FM Radio UHF/AM Radio Intercommunication Set UHF/AM Radio Instrument Landing Systems LF ADF Intraformation Positioning Set (SKE) **TACAN** UHF ADF Infrared Detection and Warning System Flares Dispenser Unit Radar Homing and Warning System IDAMST Controls and Displays IDAMST Core Elements

A detailed signal-by-signal printout for each hardware system is provided with the following data available from each signal.

INPUT: Signals originating in the avionic hardware

OUTPUT: Signals originating in the mission software

SIGNAL NAME: Brief description of signal

SIGID: Signal identification number - used for bookkeeping purposes

TYPE: Characteristic of signal interface

- Ol single ended discrete
- 02 differential discrete
- 03 switch closure open/gnd
- 04 switch closure open 28V
- 05 single ended dc analog
- 06 differential dc analog
- 07 single ended ac analog
- 08 differential ac analog
- 09 synchro
- 10 serial digital
- 11 pulse converter
- 18 resolver

VOLTAGE RANGE: The electrical voltage minimum and maximum

PARAMETER RANGE: The particular parameter characteristics minimum and

maximum

SCALE FACTOR: The parameter relation to the electrical range

RESOLUTION: The percent accuracy of the signal

QUANTIZATION: The number of bits to which the signal is resolved

U/R: The signal update rate is a per second quantity

B/R: The bit rate is the total number of bits per second

The hardware/software interfaces were obtained by examining each hardware unit and listing its characteristics when the following conditions were satisfied:

- o Avionic hardware signals which interfaces with other avionic hardware located in subsystems other than its own.
- o Avionic hardware signals which interface with mission software.
- o Mission software signals which interface with avionic hardware, including controls and displays.

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	RPC CTL 111 13001	VCC RPC CTL 111 13001	8 P C C TL 111 13001 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1   13001   1   13001   1   1   13001   1   1   1   1   1   1   1   1   1	1   13001   1   13001   1   1   13001   1   1   1   1   1   1   1   1   1	1   13001   1   13001   1   1   13001   1   1   1   1   1   1   1   1   1	1   13001   1   13001   1   1   13001   1   1   1   13001   1   1   1   1   1   1   1   1   1	1	1   13001   1   13001   1   1   13001   1   1   1   13001   1   1   1   1   1   1   1   1   1	Rest off, 111     13001     1       Are off, 114     13003     1       Are off, 114     13003     1       Rest off, 115     13007     1       Prest off, 117     13007     1       Prest off, 117     13007     1       Prest off, 111     13015     1       Rest off, 1111     13015     1       Are off, 1112     13019     1       Are off, 1112     13019     1       Are off, 1112     13019     1	1   13001   1   13001   1   1   13001   1   1   13001   1   1   13001   1   1   13003   1   1   1   13003   1   1   1   13003   1   1   1   13002   1   1   1   13002   1   1   1   13002   1   1   1   13002   1   1   1   1   1   1   1   1   1	28 CC R3C CPL 111 13001 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	13001     1       13003     1       13008     1       13007     1       13017     1       13018     1       13017     1       13018     1       13017     1       13018     1       13018     1       13018     1       13018     1       13018     1       13018     1       13018     1       13018     1       13018     1       13018     1       13018     1       13019     1       13018     1       13018     1       13018     1       13019     1       13018     1       13018     1       13018     1       13019     1       13019     1       13018     1       13019     1       13018     1       13019     1       13018     1       13018     1       13019     1       13019     1       13019     1       13019     1       13019     1       13019     1	24 VCC R2C CTL 111 13001 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	24 CC RPC CTL 111 13001 11  28 VC RPC CTL 114 13001 11  28 VC RPC CTL 114 13003 11  29 VC RPC CTL 115 13007 11  29 VC RPC CTL 115 13007 11  29 VC RPC CTL 115 13017 11  29 VC RPC RPC CTL 111 13015 11  29 VC RPC RPC CTL 1112 13017 11  20 VC RPC RPC CTL 1113 13015 11  20 VC RPC RPC CTL 1113 13015 11  20 VC RPC RPC CTL 1112 13017 11  20 VC RPC RPC CTL 1113 13015 11  21 VC RPC RPC CTL 1113 13015 11  22 VC RPC RPC CTL 1113 13015 11  23 VC RPC RPC CTL 1113 13015 11  24 VC RPC RPC CTL 1112 13017 11  25 VC RPC RPC CTL 1113 13027 11  26 VC RPC RPC CTL 1113 13027 11  27 VC RPC RPC CTL 1113 13027 11  28 VC RPC RPC CTL 1113 13027 11  29 VC RPC RPC CTL 1113 13027 11  20 VC RPC RPC CTL 1113 13027 11  20 VC RPC RPC CTL 1113 13027 11  20 VC RPC RPC CTL 1113 13027 11  21 VC RPC RPC CTL 1113 13027 11  21 VC RPC RPC RPC RPC RPC RPC RPC RPC RPC RP	24 CC RPC CTL 111   13001   1   2   2   2   2   2   2   2   2	28 VCC RPC CTL 111   13001   1   2   2   2   2   2   2   2   2	28 CC R2 CL 111 13001 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	24 CC R27 CUL 111 13001 11 24 CC R27 CUL 114 13001 11 25 CC R27 CUL 115 13002 11 25 CC R27 CUL 115 13002 11 26 CC R27 CUL 115 13002 11 27 CC R27 CUL 115 13002 11 28 CC R27 CUL 115 13002 11 29 CC R27 CUL 115 13002 11 29 CC R27 CUL 115 13002 11 20 CC R27 CUL 115 13002 11 20 CC R27 CUL 115 13002 11 21 CC R27 CUL 115 13002 11 22 CC R27 CUL 115 13002 11 23 CC R27 CUL 115 13002 11 24 CC R27 CUL 115 13002 11 25 CC R27 CUL 115 13002 11 26 CC R27 CUL 115 13002 11 27 CC R27 CUL 115 13002 11 28 CC R27 CUL 115 13002 11 29 CC R27 CUL 13003 11 29 CC R27 CUL 13003 11 20 CC R27 CUL 1	24 CC RPC CLL 111 13001 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	24 CC R2 CL 111 13001 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	24 CC R2C CLL 111 13001 11  28 JC R2C CLL 114 13001 11  28 JC R2C CLL 114 13002 11  29 JC R2C CLL 115 13002 11  20 JC R2C CLL 115 13002 11  21 JC R2C CLL 115 13002 11  22 JC R2C CLL 115 13003 11  23 JC R2C R2C CLL 13003 11  24 JC R2C R2C CLL 13003 11  25 JC R2C R2C CLL 13003 11  26 JC R2C R2C R2C R2C R2C R2C R2C R2C R2C R2	24 CC R2C CL 111 13001 1 1 1 13001 1 1 1 13001 1 1 1	24 155 825 CTL 111 13001 1 1 13001 1 1 13001 1 1 13001 1 1 13001 1 1 13001 1 1 13001 1 1 13001 1 1 13001 1 1 13001 1 1 13001 1 1 1	26 ACC RES CIL 111   13001   1   12001   1	26 JCC RPS CR 111 13001 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

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Aviolitics Foat R COMPOL LORIS STRICE   DAMAPTER RANGE   SCALE FACTOR   RESOLUTION	æ	E	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Φ	40	•	•	•	•	•	•	•	•	•	£ \ 0	
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CTL	-4	-4		-	н	-	-	#		-		~	-	-		н	-	~	-	-	-	-	••		1	-	7		-	7	3.04.4	70,40
CT C	13111	1311;	13111	13109	15107	13105	13103	13101	13099	13097	13095	13093	13091	13989	13087	13085	13083	13081	13079	13077	13075	13071	13673	13669	13667	13665	13063	13651	13059	13057	81615	VONICS
្រី ខនិស្សន៍និងស្រង់ស្រង់ស្រង់ស្សស៊ីស្សន៍ស្សន៍ស្សន៍ស្សន៍ស្សន៍ស្សន៍ស្សន៍ស្សន	29 710 Det 304 82			28 100 RPC CTL 391	115 VIC 305 CTL 3A0	28 VIC HPC CTL 380	28 500 630 616 370	28 JUC RPD CFL 360	0%E 710 Dex 300 62	24 YUL ROC CTL 330	3PH 115,4C RPC CTL		28 JC HPC CTL 260	3PH 115VAC RPC CTL	26 . AC - 20 CTL 250		39H 11596C 94C	23 170 890 CTL	25 140 APC CTL 240	SEN 115VAC RHC CFL	24 .75 435 CFL 236	30, 115VPC PPC CFL	29 40C 49C CTL 250		35- 116th CAC CTL	BOY STRUKE RUC CTL	26 VAC 6.70 CTL 210		304 IISVAC PPC CTL	23 476 85 186 616	SIGNAL NAVE	0

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SCALE FACTOR
13169 1
13171 1
13175 1
13175 1
13177 1
13179 1
13191 1
13193 1
13165 1
13187 1
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13191 1
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13223 1

1 13 0	AVIONICS	FOWLR	AVIONICS FOWER CONTROL LOGIC SYSTEM		OUTPUT				
SICHAL BAPE	SIGIO	4 4 1.6	SIGIO TYPE VOLTAGE RAMGE	PARANETER RANGE	SCALE FACTOR	4ESOLUTION	200	U/R	è
The state of the s	11225	,			•		-	₩.	
)		•					7	60	
113 DAY CONSIL MAE							-	40	
APA TISVAC APE CTL	13229	-					-	6	
IN THE STATE OFF	13231	-					•	a	
JOH TISVAC HPC OTL	: 5233	#1					٠.		
APP. 115VAC PRE CTL	13235						٠,	•	
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1 14 9	Sulfaceways duly d		2,568		THPUT				
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a/Sk3/3a 1 203	14015	n					-	-	-
	\$6041	::	V2=3				,	<b>&amp;</b>	8
£ . 1 ' 2	14107	I	757				7	•	8
E.G. 1 EST	14033	£	VE0#-0				11	-	11
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End 1 OL STF	14611	Œ	\ e • 6				11	-	11
C.	14003	٥	\$26*B*C				11	≈	25
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ट्रा ट <sup>9</sup> .उ. <b>65</b>	14008	11	437				7	80	፠
£40 2 EGF	1.610	9	A#0#-6				11	-	=
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35 TE at 20 33	14002	11	0-1.5900				10	4	40
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	1.15.0	MASTER CALITION STSTEM	A1.710%	STSTEM		INPUT				
	3.4°. 78.918	C1515	1166	FIGIO TYPE VOLTAGE BANGE	PARAMFTER RANGE	SCALE FACTOR	RESOLUTION	MVOC	8/0	æ
	16651 (G) 4614760 H2614	16051	•					<b>F</b> *	~	
	(a) (b)	15003	*					-	8	
	4.7 TEE (2)	15004	ĸŋ					-	~	
	(a) \ldots	15005	ю					-	~	
	(d)() b (b) (b) (d)	9009:	æ,						~	
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	H1, 54 L12 (P)	15009	۳					A	7	
	CE, YEM ATS.E (P)	15039	۳,						2	
	(e) \$123	15010	۳ì					4	~	
	Calling actach (P)	15011	'n					*	8	
	(3) WOLLDON (C)	15002	*1					-	~	
	(O) 578	15013	*					-	7	
16	\$411+1CE (2)	15614	m					~	8	
6	(3) 1364	15015	~1						~	
	CAFELEZII AVITET	15016	•^1					-	2	
	(D) TWOISTS	15017	•					-	8	
	PT ( 5)(LTC (C)	15018	۴						~	
	CELTER ATSLE (C)	15019	×٦					-	~	
	57CS (C)	15020	r					-	N	
	CALTION RESALLECT	15051	~					-	~	

0 51 1	FLIGHT CT	L/AV1	FLIGHT CTL/AVIO:: ICS SUPSYSTEM		INPUT				
2,44, Teval 18	State aret	3411	JOLTANE PANCE	PARAMETER RANCE	SCALE FACTOR	RESOLUTION	N N N	R/0	8/8
dmis vIv Trob	15021	_					11	8	25
SELTIC ALP TEMP.	16030	1					11	~	22
ACC FILL	27110		0 0 5 VDC	4 %	DVDC=ADC OK	ŊĽ	-	•	•
EFCS ABSVIVE (P)	16033	m			SVUCERUC FAIL		-	•	•
EFES +ARVING (C)	16035	m					-	•	••
CHurch my 4	15015	5					1.1	40	80
41- Soff3	16016	\$C					11	ю	0
VERTICAL VELOCITY	16022	'n					11	60	8
# A C ++	16014	10					16	•	128
AL.: * FLR	16020	ë					16	€	128
TELE ATASALFO	27111	2		NA		1 KNDT	11	32	352
BALLVETRIC ALT	27112	'n	0 TO 4 VOC	118 KTS TO 600KT	12.75 FAIL/WV	25 FEET	11	32	352
TUSTE SUTPUT	27113	'n	0 16 4 466	1000 TO 50000 FT	0.19M/VOLT	+062*/10.5MV	::	32	352
(3) o - 14 5 <b>7</b>	28082	ď١	0 TC +2.2 VDC	0 TO -2,2 DEG	1VDC/1DE6	0 ° 5 %	::	32	352
3.47.789	28095	ø	0 T- +14 VAC	0 TO 699 KTS	150MV/7KTS	\$ S. O	11	32	352
AIR SPEED	26217	'n	0 TO +2.2 VDC	0 TO -2.2 DEG	1VDC/10E6	0 .5 %	11	35	352
6.27.760	81292	'n	0 TO +15 VAC	3 TO 499 KTS	150MV/7KTS	0.5 %	11	32	352
THE SPEED	16024	٥					#	32	10 1
CH AIP DA CPR DUT 1	75037	10					32	32	1024
TOTAL ALP TEMP.	16028	,					11	~	22
STATIC ALR TEMP.	16031	1					11	7	22
(5) 981/38# (6)	16034	#3					-	•	•
TELC MENNING (F)	16037	m					-	40	€0
AI. SPECO	16118	S					11	10	80
C3305 -14	16019	S					11	•	88
VESTICAL VELOCITY	16023	r					11	40	8
*AC ::	16017	5 1					16	40	120
ALTIVITER	16021	10					16	60	128

1 15 0	CLICHT C	TL/AV	1 15 0 FLIGHT CTL/AVIONICS SUBSYSTEM		LOGN I				
Sawa Devicts	STELD	4 4 1 5	STATO TYPE VOLTAGE PANGE	PARAMETER RANGE	SCALE FACTOR	RESOLUTION	DUAN	QUAN UIR	8/8
OBECS HIS S'SL	16624	ъ					14		32 448
total alta reme.	16623	Ρ.					11	~	22
Statte att Temp.	16032	1					11	~	22
(d) britinge side	16035	'n						60	€0
(3) of Irose \$3.3	15034	*					-	40	•0
0 70071 5434 444 471	76.031	σ					3	4 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	4 3 3

		# STREAMS SOLL OF DAY 17 TO TO THE TAIL		10/41/00				
1 15 0	:::1:		DARAMETER RANGE SCALE FACTOR	SCALE FACTOR	RESCLUTION	QUAN U/A B/R	۲,9	8 / W
	£1918	SIGIS THE VOLTBOT RANGE						
						90	35	80 32 2560
* S	16003 10	10				e e	32	80 32 2560
2 5 2 2 2 1 - 1 2 2	16006	10				90	32	80 32 2560
9.000	200	0.5						

,		5	WATER AN ASSESSED TO THE SECOND		Tude.				
Control of the second	Sigic TYPE	id k	VOLTAGE RANGE	PARAMETER RANGE	SCALE FACTOR	RESOLUTION	OUAN	U/8	à
(dspokanel) of the	27052	10	19A S 60 0	d 2		иA	160	32	\$120
taköökelesi ür ise.	26322	10	P 38 VDr	MA		1.3	160	2	5120
CATE AC 17 THUS 400M	46615	9 <b>1</b> 0	0 CH 5 VPC	41:		a v	16	32	512
WOOTE TO THE STANDARD	27095	0.1	O CR S VCC	<b>ড</b> ে		NA	16	32	512
TATA WOY TRUEADONE	27036	10	0 68 5 VOC	714		K.A	16	35	512
0a33k576. Alm 1.49	160:0	30	20 v S 80 v	νν		r.A	16	32	515
\$2710 CAMP GEN	21163	٣					-	ŧ	
The capt drait	21164	m							, :
3-175 LAMP 5TO	2:165	*1							• :
3-272 Eado PTA	21165	ĸ					٠.		• :
プサートロー しゅっしょうしゃく	21167	<b>~</b> )							• :
148 6497 CA	21169	m					٠.	,	• ,
*11_10-110 5*	78746	-		•			4	•	*
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U TS TATABLITY	29193	-	20∧ 00€*0+ 03 113dJ	N.A.	OPENETE OK	N.A	-	35	32
1.0 -5 -4 -1.0 -1.0 -2.0	25637	•	CPE-1 OF Zevoc	44	.380VDC=TF *0 OX OPEN=VO RANDE	<b>4</b> 72	**	3.5	1
1031 EV 06 135	28634	•	30A46 HO 1340	<b>4</b> 2	28VJC=RA746E OPF7=10 TEST	<b>4</b> N	-		ָרָר רָרָּ
400.000.000	25173	ŧ	SPET OF PENDE	7. A	2AVDC=TEST OPETETO HAMCE	¥14	• -	, 5	2 2
TE PELIMBILITY	26162	'n	0 TO +2.2 VAC	n TO -2.2 DEG	28VLC=>4.6E 1VDC/OF6	۲. ۵	· :	; ;	3,5
SEASO FALSE	21074	'n					: :	. «	
#21" "H 205 (X,Y,Z) 21043	21043	<b>J</b> .	0 70 11.0 VAC				: #	, 1	

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MOT THE SOURCE																														
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5 t 3 td a	<b></b>		#1 E)	*)	E H)	<b>-</b> )	, ·	<b>4</b> 1	*7	*)	-)	<b>~</b> 1	الد	רע	۱د	S	~	<b>,</b> )	۳ì	٩	۳,	m	r)	۳۱	М	м		۳	u1	ស
		•	21015	21076	21277	22.27	21:13	26010	16012	21052		2:11:5	± 8012	58474	21686	2:097	51043	16012		21102	21103	21134	23155	21138	2:139	21159	21113	21150	21146	2:147
۲.	,		**********	i i	249 222 428 4000	7 (B) 1/2 34 (C) 48	7 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	Control of the Contro	0.000			192121 : 210	735 74	130 . At 12 % 5	7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	17			1708-1 700 3- 10	3755-6 455 75 75	31/34 T38 31.48e	02/001 T30 30 Km	3675#6 *38 344F5	111111111111111111111111111111111111111	12 (2 ) 3 (2 ) 4 (2 ) 4 (4 ) 4	* \$ - \$ c (c - § *)	រដ្ឋាធិប្រជិញ្ញាក់កំព	13424 04334061	9342 Peri 1734	1150 E. 1 50175

100 200 200 200 200 200 200 200 200 200	01915	1100	STOLO TYPE VOLTAGE GANGE	PARAMETER RANGE	SCALE FACTOR	RESOLUTION	SUCK	11/R	8/8
(1) (U) (1) (U) (1) (V) (1) (V) (1) (V) (V) (V) (V) (V) (V) (V) (V) (V) (V	21149	35					11	æ	e C
* I V 3 3 4 3 *	21151	u)	-15 JOC TO C				11	40	8
STRATE PERMITS BY	21152	'n	+4.3 VOC 10 0				11	10	9.0
73/3* 00 03*8	21141	7					11	60	€
TOPTH STAFFLITY	21054	ň					-	~	~
PURD HERRISTON CAN	>9012	۳ì	S VDC					~	~
1437 STS 175641	75015	~	<b>ว</b> กก ชีช					~	~
SCAT YOUR PRIGHT)	21068	M)	50A 82				-	7	~
146.4 STAP	21063	'n	5 VI'G				-	32	32
SECTO 11 14 STO	21645	α	-1.7V TO +1.2 VAC				11	32	252
DO TENTO	943:6	۵	0 75 2.2 446				11	32	352
121 per 181 (EUS)	21644	18	P T 1 18 VPC				14	32	4
2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	21623	*	@ TO 26 ST				-	~	8
אוווע (מיגיאיד) אוווע אוויי	21016	2.					14	16	224

OUTPUT

Lots Parice PabaR....ANZAPD-122

	CO PRINCE CONTRACTOR C		TUANI		ě	9,	ģ
<u></u>	TYPE VOLTAGE RANGE	PARAMETER RAVIE	SCALE FACTOR	RESOLUTION	õ	, ,	8/8 X
	1 0 0 % 5 VOC		0 V DC = 0 K	4 2	1	32	32
s	0 TO 25 VOC	0-5000 FT	35MV/7FT	7 FEET	11	32	352
S	9 TO 25 VDC	0~5000 FT	35MV/7FT	7 FEET	11	32	352
	5 0 TC +25 V7C	0 TO 5.000 FT	35MV/7FEET	7 FEET	11	32	352
<b>E</b> .	1 0 70 5 VAC		0VDC=0K	ď	-	32	32
٥	0 10 25 900	0-5r0c FT	35KV/7FT	FEET	11	32	352
5	3 TG 25 VPC	0-50C0 FT	35MV/7FT	FEET	11	32	352
c	5 0 10 +25 100	0 TO 5.000 FT	35MV/7FEET	7 FEET	11	32	352

	8/8 8/	•
	U/R 8/R	1 8
	OCAN OCAN	
	RESCLUTION	NA
CUTPUT	SCALE FACTOR	OPENHO SELF TST NA GND-SELF TST INI
	PARAMETER RANGE SCALE FACTOR	<b>4</b> 6.
DARIAN ALTIMETERS AN APPRILAT (2)	SIGIO TYPE VOLTAGE RANDE	23 <b>213</b> 3 6400%p
,	a the second	SEL 7 TEST

0 * ~	MASHET	TC COMP	PASHETIC COMPASSC-12		001001				
2 m m 1 m 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1915	3d11 C	SIGIO TYPE JOLTAGE RANGE	PARAWFTER RANGE SCALE FACTOR	SCALE FACTOR	RESOLUTION	BUAN	F/8 #/0	8
(A) ISH LUIT	24028	6 83					*	0 112	113
PILCT PA41	8 24119	6					:	14 0 112	113
		6					1.4	0 112	112
							**	14 8 112	113

9 \$ 2	IP.ERTIAL	P, AVIC	IRERTIAL RAVICATION SYSTEM		TUPUI				
Sabr Tytels	81610	TYPE	SIGIO TYPE VOLTAGE RAMSE	PARAMETER RANGE SCALE FACTOR	SCALE FACTOR	RESOLUTION	OUAN	8/2	8
HERES UP SISHE IN 1 PS615	25615	<b>1</b> 0					908	~	#
DAS CHICARY FAR	25929	н	1 +28 VDC		28VnC=TPUE		4	*	
RA . ES TO DEST U' L'S	25523	6		6/0		1/2 MILE PR	<b>.</b>	*	Ĭ.
RAYSE TO DEST TENS	25024	۴		06/0			**	+	N.
RAT DE TO DEST MOTOS - 25025	25025	6		006/0			14	*	Ŋ
0.12456 35241.0	92356	6		C/350 DEG	1053=1056	5 DEG	14	#	ψ.
化水果 化铁铁矿 化电池	25027	4		93¢ 09£/0	1056=1056	5 7EG	:	*	S.
COURT OF BUILD	25022	-	A/5+28 VDC		28VDC=TRUE			•	
たまけべい れつとがま	25005	91					32	16	51
Source Claratus	25030	ç		+-10 DEG	150 UA/10 DEG	1/16 DISP	11	32	35
J	25018	6		0/360 056	1066=1566	0.1 DEG RVS	<b>*</b>	32	3
13,10	25021	6		930 06-+	1056=1056	0.1 DEG R*S	*	<b>*</b>	89

0 80 84	INERTIAL	. r.AVIG	2 5 0 INERTIAL PAVIGATION SYSTEM					i	1
Swatt Langis	41915	TYPE	SIGIO TYPE VOLTAGE RANGE	PARAMETER RANGE SCALE FACTOR	SCALE FACTOR	RESOLUTION	7 Y O	Z/2	<b>6</b>
;	6	-			6ND=TRUE			~	~
I's PC-E3 ON	6030	•	4		28VOC=TRUE		~	7	~
ATTITIOE WODE	01052	-	20.05 1 20.05				39	9	512
FL CTL '4 PIL CUT 1 25002 10	1 25002	01					5	12 32 1024	1024
		•					3	•	

2 5 0 CHEGA NAVIGATION SYSTEM	4 K C A C A C	VIGATION S	YS7E#						
Emmail To €	SIFIC	TTPE VOL	SIGIO TIPE VOLTAGE RANGE	PARAMETER RANGE SCALE FACTOR	SCALE FACTOR	RESOLUTION	QUAN UZR BZR	U/R	8 / B
26.03 AY(P) 26.03 10	26.63	01					192	192 2 384	384
. 54 0132-pt(C)	26.004 10	01					192	192 2 384	384

ن د	OVEGA NA	S S C OVECA NAVIGATION SYSTEM				;	•	•	
3 W. Je. 318	\$1612	SIGIO TYPE VOLTAGE PANGE	PARAMETER RANGE SCALE FACTOR	SCALE FACTOR	RESOLUTIO?	NAUG	x/0	¥	
						-	70	•	
DAESE SYCTEM OF	26.005	7				32	16	32 16 512	
1#679110438	26002 10	10				7	14 16 224	224	
	25001 4	Or Or				•			

0	HF / SSB R	Ap.10.	HE/SSB RADIOAM/ARC+12%		INPUT				
2 m 42 14 40 2.	SIGID	TYPE	SIGIO TYPE VOLTAGE PANGE	PARAMETER RAVIE SCALE FACTOR	SCALE FACTOR	RESOLUTION	9UA1:	X/2	ar Ar
	\$5158	(4	75725 5 -5 VOC/+10 VOC		+5VDC=K/+10VDC=X		**	~	~
f 175	32027	۰ ~	32027 2 +10 VDC/-5 VDC		-5VDC=R/+10VDC=X		-	~	N

HEZSSB RACIOARZANC-193 STOTO TTPE VOLTAGE RAN
32001 3 GMD/OPEN
32002 S GNN/OPEN
32003 3 G D/OPEN
\$2034 3 GM70PEN
REGOS 3 CNEZOPER
32006 3 GUNZOPEN
32007 3 GND/OPER
32008 3 CARZOPEN
32031 2 +10 VPC/6ND
32637 2 +10 enc/a Vac
32009 3 GAP/APEN
32019 3 GRD/APEN
434773K5 8 1108x
32012 3 GRB/OPEN
32013 3 GNC/9PEY
32014 3 GMC/OFER
32015 3 GREVOPER
M20170777 6 91038
32017 3 SUGZOPEM
32018 3 6NU/CPER
32019 3 GNF/OPEN
32020 3 GENZOPEN
32021 3 G11070PEN
32038 3 GUNZOPEN
32046 3 GND/UPEN
32041 3 GND/SPEN
32622 4 0PEN/-5 VDC
72728 5 +10 4007+5 VDC

	A9 988/ 74	01	ME / SSP PATTO AM / ARC = 123		001601				
,				PARAFTER RANGE	SCALE FACTOR	RESOLUTION	QUAN U/R B/R	U/R	B/8
: x* 70.515	21818	<u>.</u>	ACT OF THE PART OF						
							11	~	2 22
HE CATH CONTACL	32629	.n	32629 5 +10 4507=5 450				-	~	25
1021162 4513115	32039	ζ.	32039 5 +10 VOC/-5 VOC						
DOV ANALOGY ANALOGY ANALOGY ANALOGY	60.1	4	30A 98+/3JA 41+				11		2 22
action for often	56.36	,					11	~	2 22
24-11-2 113 VOLTGE 32034 5 +11 VPC/+3# 1PC	15034	'n	+11 UPC/+3# .PC				:	0	c.
3( A ()/ )() A () =	9 4 6 6		0 ( A   0 / 0 ( A   6 )				1		;

AD-A083 113 UNCLASSIFIED	BOEING COMPUTE NOV 76 SPEC-SE	TER PROG 5	GRAM DEV	SEATT! VELOPME	NT SPEC	CIFICATI	MILITARY ION FOR R-76-206	Y AIRPL- IDAMST F3361: 8-ADD-2	OPERAT	TIONET	ž TC(U)	
3 of 3 40: 40:834												
								END DATE FILMED 5 80 DTIC				

	: 0 m	"HF /F" RADIO" FM-622	4010.	. Fm-62	œ.			001901				
	Barr Tribles	81612	TYFE	TYFE VOLTAGE RAMGE	R R	194 194	PARAMETER RANGE	SCALE FACTOR	RESOLUTION	DUAN	8/0	ò
	TOLE SGUELCH GROUND	33001	m	OPEN OR GROUND	78 <b>6</b> 8	OUND	Z A	OPEN±NO SOUELCH	d 2	•	•	
	SUCELCH DISABLE GND	33005	*	OPEN OR GRAUMP	35 86	OUND	NA	OPEN=SWULLCH OPEN=NO DISABLE	4	•	•	
	0.05 °C SE_ECT E	33005	m	OPEN OR GROUND	E GR	OUND	# X	GNO=DISABLE OPEN=NO SELECT	NA	•	•	
	סינפ שנ פב"בנו נ	33486	m	OFER OR GROUND	£ 5	onno	NA	OPEN=NO SELFCT	V.		•	
	3 133 3K 35 3K 63*0	33007	•	OPEN CH GRAUMF	3.	JAAC	PA A	OPERANO SELFCT	V.		10	
	DATE WE SELECT B	33008	m	OPEN OR GROUND	ž	ONNO	Ø.	OPENSTREET	NA	-	•	
	C.05 4C SELECT A	33009	m	OPEN OR GROUND	K 65	O-NO	NA	OPEN=NO SELECT	V.	~	•	
	53.C A 30-52 MC	33010	m	OPEN OR GROUND	K 6R	ONNO	A M	OPEN=NO SELECT	A N	-	•	
	54.5 9 53-76 MC	33611	ю	CHEN OR SADDAD	R 54	つかれつ	AA	OPEN=NO SELFCT	NA	~	•	
	PC SELECT S	33012	м	OPEN OR GROUND	35	որկո	NA	OPFN=NO SELECT	4 Z	~	•	
	MC SELECT C	33013	ю	OPEN OR GREUND	R GR	CUND	P,A	OPENAND SELECT	NA	-	•	
	PC SELECT 2	33014	ю	OPEN OR GROUND	R GR	ONO	KA.	OPENEND SELECT	NA	-	•	
•	PC SELECT 3	33015	ю	OPEN OR GROUND	8 5R	OUND	NA	OPENEND SELFCT	NA		•	
02	PC SELECT &	33016	ю	OPEN OR GROUND	89	OUND	NA NA	OPEN=10 SELFCT	¥.	~	•	
	RAZAR COUT	33031	ю	OPEN OR CHOUND	H.S.	OUND	NA	OPEN=NARROW GND=#IDE	NA	-	•	
	THE POESS-TO-TALK	33033	ю	ONUCAS PO M390	14 GR	ONNO	NA	NA	NA.	-	•	

12 0 4 10	4F /AM RA	.010.	VHF/AM RADIOHILCOX 807		OUTPUT				
5.02 P 3.028	S1610	777.6	VOLTAGE RANGE	PARAMETER RANGE	SCALF FACTOR	RESOLUTION	OCAN	۲/۵ ۲/۵	8/8
1005 FRES SCL 2004	34001	*	:/0				-	N	~
	34002	-	6/1				-	~	~
10**2 FKES SEL 2**2	34003	-	1/0				-	~	N
13mm 2 6545 Sel 1**1	34004	-	1/0				~1	~	N
145 FRES 3EL 2005	34005	-	0/1				-	~	N
Jan 2 EBE 3 CET South	3400	-	0/1				-	~	~
8002 735 8324 2061	1034	-	1/3				~	~	~
14HZ FRED SEL 2002	34004	7	0/1				-	~	N
1842 5EC 2041	34699	~	5/3				-	N .	~
0.1 PHZ FRO SEL 4.05	34610	-	0/3					~	~
C. 1717 F 75 SEL 2004	34011	-	6/1				-	~	N
0.11"2 F73 SEL 2**3	34912	-	6/1				-	N	~
0.17 HZ FR3 SEL 2002	34013	-	113				-	~	~
C.1747 FR3 SEL 2401	34014	-	1/1					~	~
C.01 47 F. SEL 645	34015	-	0/1				-	~	~
B. 13 WHZ TO SEL END	34016	~	1/0				-	N	~
0.01 442 FD SEL 2+83	34617	-	1/3				-	~	~
0.614HZ 73 SEL 2002	34018	-	1/0				-	~	NJ '
0.514HZ 79 SEL 2441	34619	•	:/0				•	•	rų .
6.005 MAS #55EL 2**2	34620	-	٤/1				-	~	~
0.005*HZ F3SEL 2**1	14021	-	6/1					~	••
FREG SEL COM+	34052	~,	GNC/OPEN				-	~	~
SO DISABLE COMP TST	82J#8	m	G:C/CPE?				-	~	•
JUCZNO BLONDO	24054	*	0/27.5 VDC				٠	~	~

184 i

5 5 0 INTERCOMPUNICATION SET	1 VTERCOM	PUNIT	ITION SET				•	•	9
SESTAL LAME	4:610	TYPE	STOTO TYPE VOLTAGE RANGE	PARAMETER RANGE SCALE FACTOR	SCALE FACTOR	RESOLUTIO4	8/4 U/A B/A	Š	¥
;		•	2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0				•	~	~
FUSH-TO-TRUE	34063	n					-	•	•
UMF PACIO CATRL	36043	•	36043 3 OPEN 28V CLO GND				•	•	)

	8/8	•	•	*	3	*	2	*	*	*	*	*	*
	3/3	*	•	*	\$	*	*	*	<b>→</b>	*	*	*	3
	GUAN	~	-	•	-	H	-	=	4	**	1		-
	RESOLUTION												
OUTPUT	SCALE FACTOR												
	PARAMETER RANGE												
INTERCOTTONICATION SET	TYPE VOLTAGE RANGE	OPEN 28 V CLO GND	OPE' 28 V CLO GND	CPEN 28 V CLO GND	OFE 4 28 V CLU GMD	0PEN 28V CLO 6MO	OFEN 28V CLO GND	OPET 28V CLO 640	OPE'S 26V CLO GND	OPER 20V CLO GND	OPEN 26V CLO GND	CPEN 26V CLG 6RD	2e v
431.40.	TYPE	m	m	n	*)	₩	٣	m	'n	m	m	ю	•
INTERCO	Sieic	36006	36007	36008	34039	36030	36653	36660	36561	36062	36075	36684	46005
0 9 F1	English to 1825	CC.T-2L 72S 54WF R 36006	CLIPL PCS3(VHF/AM)	£\$34 762'.3	CHSSZEMINSON DELLO	CO TL 8031 (SPACE)	CO TEN POR STUTE H 36653	C.TSL PCS # (V-F/A% 36660	F 204 2473	C919E #SS/34) # \$03 Te113	CO TE POSPISHEZEM	CO TE FOST (SPARE)	IC 1 CC-L CNIBL

TECTAR CTAL COTHE

,									
Seen Jenny	81610	TYPE	SIGIO TYPE VOLTAGE RANGE	PARAMETER RANGE	SCALE FACTOR	RESOLUTION	PUAN	E/2	₩.
Salturn DISABLE	19617	m					-	~	
	1961	•					•	~	
الموسقة ويراعدو	61061	m					-	~	
10.E = EY	19613	m					-	*	
ST S	39014	•						•	
920780 G8109	39022	м					**	•	
REZECTED TOTAL OUT	39054	m					+	•	
MY/SUAFO INTER IN	39625	n						*	
PRESET FRES MEAL	39026	m					-	•	
XMT/ANE BUTLION	39016	đ					,,	*	
A *1 A CE *	19021	m					=	•	
TH POR HOTEON LAN	39003	9					11	Φ.	
MAIN SAUELCH AND CT	39004	•					11	•	
IH FCC 78 Section	39465	٥					11	•	
School Sw Age CT	39936	9					11	•	
Saufich ofskalf	39664	m						~	
.;,	39065	**					н	~	
-0154 CF/3FF	39068	~					~	~	
TG: 2 4EY	39068	m					<b>~</b>	*	
ADF ETABLE	39061	n				,	#	*	
60250 017355	39069	m						•	
KT/SUASO INTER OUT	39971	••					-	*	
KY/SUAPS INTER 19	39372	m					-	•	
PRESET FREST PRAIN	39073	ю					4	•	
APT/ESF TAFLOGR	39063	3					-	•	
AUG LAN	39068	m					-	•	
TH PUR HOLEDON AND PT	39056	٠					11	•	
MAIN SOUTHER AND CT	13061	£					11	•	

0 6 8	CHF PARIO ANIARC-164	A11/ARC-164			100000	MAUG	11/R 8/R	#/B
SESTAL DATES	SIGIO 14PE	SIGIO TYPE VULTAGE KANGE	PARAMETER RANGE SCALE FACTOR	SCALE FACTOR				
	,					=======================================	11 0	£
60497 SG 475 41	39052 6					11	•	90
SUMPE SO ABUILT	39053 6							

INVESTIGATION OF THE STREET ST
VOLTAGE RAMGE
GND/OPEN
GNC/OPEN
SNC/OPEN
GNOVOPER
GIIC/OPEN
GIDZOPEN
61:D/OPEN
GND/GPEN
GND/OPEN
GVB/OPFt
GND/OPEN
SND/OPER
GND/OPEN
GNO/OPEN
GHD/OPEN
GND/OPEN
GND/OPEN
G1:D/APEN

		0	INSTRUPE	HT LAN	INSTRUMENT LANDING SYSTEMANJAPH-108 (2)	AP11-108 (2)	IMPUT			
	SIGNAL NAWE	1.3 9 4.7	81610	11PE	SIGIO TYPE VOLTAGE SANGE	PARAMETER RAYGE	SCALE FACTOR	RESOLUTION	BUAN	5
	23 604	UNI HE MARKER HEARS 41051	41051	47	GNEZOPER		GND=1/OPEN=n		-	
	1300HZ	1300HZ MAR BEACA	41082	*	M340/QH9		6ND=1/OPEN=0			
	3900HZ	3000HZ M44 PEACN	41083	m	SNE ZOPER		GND=1/OPEN=0		-	
	24 304	ADC HZ MRRKEN BEACH	41094	*1	SAD/OPER		GND=1/OPEN=0		-	
	13061	13COMZ MAR PEACH	41095	^	5ND/OPEN		GNC=1/OPEN=0		-	
	300042	3000HZ MER SEACH	41036	<b>F</b> 3	SND/OPEN		GND=1/OPEN=n		#	
	LOC 11.5	LOC INST DEVIATION	41059	·s					11	
	LOC FLA	LOC FLAG DUTPUT	41060	٠					11	
	65 11.27	65 INSTR DEVIATION	41661	•					11	
	65 FLAG	6S FLAG SUTPUT	41062	٠					::	
	LOC CEVIATION	/IATION	41667	٥					==	•
	6S CEVIATION	1A713%	41068	•					11	
	LOC FEVIATION	VOTTA!	41063	9					11	
1	6S FEVIATION	TATEOG	49014	9					11	
90	16.5 FLA	O LPG FLAG SJIPUT	41065	٠					11	•
	GS FLAG	GS FLAG 3JTPUT	41066	¥					==	

32 32

. 1 0	I :: STRU"E	NT LAN	INSTRUMENT LANDING SYSTEM ANZAPN-10A (2)	12) 4	OUTPUT			
STONAL NATE	SIGIO	TYPE	SIGIO TYPE VOLTAGE RANGE PA	PARANLTER KANGE	SCALE FACTOR	RESOLUTION	BUAN	Š
1"+7 FRE3 SEL B	41008	n	GND/OPEN		6ND=1/OPEN=n		-	
14-2 FRE3 SEL E	41669	m	GH0/0PEN		GND=1/OPEN=0		-	
O.1 WHZ FRED SEL A	41619	m	4340/JN9		6ND=1/0PEN=0		**	
0.1 PHZ F752 SEL B	41011	~	RADZOPEN		GND=1/OPEN=9			**
3 73S 6364 ZH.1"0	41012	m	CND/OPEN		GND=1/OPEN=n		-	••
D TIS SER ZHELTO	41013	м	GND/OPEN		GND=1/OPEN=9			••
1P-2 FAES SEL B	41642	m	GND/OPEN		6N0=1/0PEN=0		-	•
19,7 FFE2 SEL E	41043	ю	GND/OPEN		GND=1/0PEN=0		-	•••
Onlynz Fall SEL A	41644	ю	GND/OPEN		6ND=1/OPEN=n		-	•
6.147 F353 SEL 8	41045	m	GHP/OPE*:		6ND=1/0PEN=0			••
B 138 ESCA ZHATAD	9:01:	m	GND/GPEN		6ND=1/0PEN=n		-	
0.11742 54TG SEL C	41047		SND ZOPEN		GND=1/0PEN=0			•

	QUAN U/R B/R	14 8 112	14 6 112
	DON	*	2
	RESOLUTION		
	SCALE FACTOR		
	PARAMETER RANGE SCALE FACTOR		
	SIGIO TYPE VOLTAGE RANGE		
,,,,,	TYPE	•	٠
	81610	42036 9	42037 9
•	HARN TRADES	# 4FC 085	546 CATA S

D #0	. Z	TRAFORM	1AT 10P	INTRAFORMATION: POSITIONING SETAN/APN-169A	/APN-169A	INPUT				
SIGP.AL PAME	Ţ·	SIGIC	TYFE	SIGIO TYPE VOLTAGE RANGE	PARANETER RANGE	SCALE FACTOR	RESOLUTION	BUAN	8/3	2
LAPP TEST 380070		43015	M					<b></b>	-	
LAYP TEST SKOUND		43016	#n					-	-	•
LAMP TEST SROUND		43017	'n					-	-	•
REC LEFT TJRN LP	G	43075	m	+5 VDC		GND=1/0PEN=0		-	-	•
REC SLOWDOWN LP GND		43076	ĸ	+5 voc				•	-	••
REC LETOSAN LP 640		43077	m	+5 VDC				-	-4	
REC EXECUTE LP GND		\$307£	m	+5 VDC				-	-	
REC PULLUP LP GND		43679		+5 voc					-	
HEC SPEEJ JP LP GNO		43040	m	+5 400		6110=1/0PEN=0		**	-	
8 PJ UNUT THOSE DAM		43081	m.	+5 VDC		GMD=1/OPEN=0		-	-	
LEGENT OF ME	3	43012	*	5 VDC					~	
MASTER LAMP SUP	•	43070	3	OOR 5 VOC		0VDC=0/5VDC=1		-	-	
MISTER LOSTLAND GND		43971	*	DOR 5 VDC		0VDC=0/5VDC=1		<b>~</b>	4	
CAUTION LAWP 670		43072	*	0 OR 5 VCC		0V5C=0/5V0C=1		-	-	
PROXITITY ARMG LP G		43073	*	0 OR 5 VUC		0VDC=0/5VDC=1		~	-	
רבינוים סוג	4	43011	s	8 TO 5 VDC				11	-	7
*10 07321	-7	43653	s	8 TO 25 VEC				11	-	-
FESENS SIM	•	43054	'n	9 TO 28 VDS				::	-	-
TWO INSLOT LEG	J	43001	ю	0 10 5 400				-	~	
TAD MASTER LCG	-	43002	ŧO.	0 TO 5 VDC					~	
NO GG LCS	•	43003	m	0 TO 5 VEC				<b>4</b>	N	
MASTER LAMP LCG	-	43064	<b>h</b> )	0 TO 5 VPC				-	~	-
MASTER LAND LCG	-	43005	'n	0 TO 5 VOC					~	
XMIT HTTJAN LP CTL		43086	m	S VÕC		GND=1/OPEN=0			N	
XMIT SPEEDJP LP CTL		43088	m	s voc		6ND=1/0PEN=0		-	ď	
XMIT PULLUS LP CTL		43690	м	5 V9C		6ND=1/0PE4=0		•	~	-
XMIT EXECUTE LP CTL		43092	ю	5 VOC		GND=1/OPEN=0		-	~	
XMIT LETSSAN LP CTL		43034	m	5 400		6ND=1/0PEN=0			N	.,

0 n	INTRAFORM	MOITA	INTRAFORMATION POSITIONING SET AN/APN-169A	•		2	3	4
EMMIN (WIDES	\$1615	<u>د</u> د	SIGIS TY E VOLTAGE RANGE PARAMETER RANGE	SCALE FACTOR	RESOLUTION		3	
		1		GND=1/OPEN=r		<b>ન</b> '	~	
XMIT SLUADY LP CTL 43096 3 5 VEL	46014	*3	י אַנּיר	A SAPERED		-	~	••
XMIT LFTJRV LP CTL 43898 3 5 VDC	43094	m	3 VOC			11	~	ä
ALTITUDE RIFERENCE 43111 5 0 TO 5.5 VOC	43111	ď	G TO 5.5 VAC			::	•	•
RAYS WATE ANA CONT	43643	s	5 0 TO 22 VDC			11	32	35
nier attitube cret	43112	a)				11	32 35	10
1 CM		1						

	SIGNAL NA"E	SIGIO	ATION TYPE	INTRAFORMATION POSITIONING SETAN/APN-169A	AN/APN-169A Paramttr range	OUTPUT SCALE FACTOR	RESOLUTION	OUAN	#/n	
	LNG GEAR SAIAUSS)	43146	m						-	
	LAMP TEST SAUUND	43015	••					••	-	
	LA P TEST SPUUND	43014	n					-1		
	FRES A FOSY	43027	**			6ND=1/0PEN=0		-4	-	
	EREC & POSV	4302A	ĸ			6NO=1/0PEN=n		•	-	
	RELAT KETU4R	43029	•			6ND=1/OPEN=C		~	-	
	164 FT/9845E MARK	43044	m	OPEN & GNO				•	-	
	68 FTZRANSE MARK	43045	€0	OPEN 3 SNU				-	-	
	4K FTZHALGE MARK	94984	m	OPEN & GND				-	-	
	2K FT/PAUSE MARK	43047	ю	OPEN & GND				-	-	
	IN FIZZAUSE MARK	43049	m	OPEN & GMD				-	-	
	FREGLETET	43019	3	0 TO S VOC		0VBC=0/5VBC=1		-	-4	
1	F PEGUELCY 3	43020	#	0 TO 5 VDC		0VDC=0/5VDC=1		-	-	
95	STRY Salt POSITION	43021	•	0 TO 5 VDC		0VBC=0/5VBC=1		-	-	
•	master sisual	43022	*	0 10 5 400		0VDC=0/5VDC=1		-	-	
	FOLLOVER SIGNAL	43023	•	0 TO 5 VDC		0VDC=0/5VDC=1		-	-	
	BITE TEST	43024	*	0 TO 5 VDC		0VDC=0/5VDC=1		-	-	
	BITE TEST TOMPL	43025	*	0 TO 5 VDC		0VDC=0/5VDC=1		-	-	
	LESS O BIM	43031	ø	e to S vec				11	-	
	RA GE MARE SAT CONT	43042	v	0 TO 5 VDC				11	-	
	RIGHTUNN SAITEN	43087	#	s voc		6ND≈1/5VDC=0		-	~	
	SPEEUUP SAITCH	43689	*	5 VDC		GND=1/5VUC=0		•	~	
	PULLUP SATTEM	43091	*	5 VOC		GND=1/5VDC=0		-	~	
	HOLLING ILCOBES	43093	•	5 VDC		GND=1/5VDC=n		-	~	
	HOLLER SATTOM	43045	•	5 VOC		GND=1/5VDC=n		-	~	
	SLOWDOWN SAITCH	43097	*	5 VDC		GND=1/5VDC=0		-	~	
	LECTT 'SE SATTOM	43099	*	5 VDC		6ND=1/5VDC=0		~	~	
	AUSIO OFF	13139	n	0 000		6N0=1/0PEN=1		-	~	

0 0	INTRAFORM	ATION	INTRAFORMATION POSITIONING SFTAN/APN-169A	1694	OUTPUT			
STONAL NAME	S1610	1766	VOLTAGE RANGE PARAM	PARAMETER RANGE	SCALE FACTOR	RESOLUTION	900 BA	¥,
AURIO PESET	93140	w	ס אטכ		GNU=1/0PEN=1		-	~
ID FUSHBUTTON	43105	<b>*</b>	0 TO 5 VOC		GND=1/5vDC=0		-	~
LENDER HUMBERATTORN	43106	#	0 TO 5 VPC		GND=1/5VDC=n			~
LEADER GUMBER(TTO4)	43117	<b>3</b>	C TO 5 VEC		6NP=1/5VDC=n		-	8
LEADER 1243FALTTO2)	43108	3	0 TO 5 VDC		620=1/5v0c=n		-	~
LEASER RUMBER(TTO1)	43109	#	C TO 5 VOC		GND=1/8VDC=0			N
LESDER GUMBER(TT19)	43110	ŧ	0 TO 5 VDC		GND=1/5vDC=n		-	~
ALTITUTE 1900	43113	<b>.</b>			SVDC=50"/GND=++-		-	· N
ALT DEFSET POLANITY	43114	<b>.</b>			5VDC=++50/6ND=-		-	N
TPACH GFFSET (X10K)	43118	*	+5 VDC TO R VDC		640=1/SVDC=0			~
TRUCK OFFSET (KBK)	43119	•	+5 VDC TO N VDC		GNC=1/5vDC=0		-	~
TRACK OFFICET (KHA)	43120	*	+5 VDC TC 0 VD.2		GND=1/SvDC=n		-	8
TRACK OFFET (YZK)	43121	<b>.</b>	+5 VDC TO P VDC		GND=1/5VDC=0		~	~
TRUCK GEFSET (Y1K)	: 3122	3	+5 VOC 10 P VOC		640=1/5v0c=n		-	~
LEFT/4164T SATTCH	43123	ŧ	+5 VDC TO A V1C		GND=1/5vDC=n		-	N
MIN OFFSET (The)	43124	,	+5 VGC 10 4 VGC		6ND=1/5VCC=0		-	~
XTA CFESET (Y2V)	43125	5	+5 VDC 10 N VDC		GND=1/SVDC=0		-	N
ATH OFFSET (114)	43125	#	+5 VDC TO A VDC		6:40=1/5v0C=n		-	~
XTF OFF3ET (Y200)	43127	•	+5 VDC TO A VDC		GND=1/SVDC=n		-	~
MIN COFSET (T400)	43128	*	+5 VDC TO 0 VDC		GND=1/5vDC=n			~
XT/ OFFSET (7800)	43129	#	+5 VCC TO A VDC		GND=1/SVDC=n		-	~
XTA OFFSET (Y105)	43130	ŧ	+5 VOC 10 A VOC		6ND=1/SVDC=6		-	~
LEASE 34 (TT235)	43131	*	0 TO 5 VOC		GND=1/5VDC=n		-	~
PROX 4915 SE(PESB)	43135	•	0 TO 5 VAC		SvnC=1/6ND=0		<b>-</b>	~
PACK APUS SEEPASE)	43136	#	0 TO 5 VDC		SVCC=1/GND=n		-	~
PROX JRIG SE(PES2)	43137	•	0 TO 5 VDC		SVDC=1/GND=0			<b>?</b>
PACT LANG SLIPASI)	43136	*	0 TO 5 VDC		SVDC=1/GND=n			~
ALT OFFSET VOLTAGE	43115	₽°	+2.7 TO 5.1 VDC				11	~

c n	INTRAFOR	MATION	INTRAFORMATION POSITIONING SET AN/APN-169A	N/APN-169A	00100				
STONAL MAWE	61518	TYPE	SIGID TYPE VOLTAGE RAVGE	PARAMETER RANGE	SCALE FACTOR	RESOLUTION	PCAN	BUAN U/R	£/0
TOTAL STATE	43036	1					1	7 16 112	112
A44 37 444	43037						,	7 16 112	112
SECTORING TOWN OPT	43955						-	32	32
X DEFLECTION	43033	٥					11	11 32 352	352
ACTED BIRTH	43034	9					11	11 32	352

4 5 9 TACA!!AH/ARN-118	TACAN	. AN/A	RN-118			NOT THE LOSING	BUAN U/R	۲ ۳	8/8
10 × 10 × 10 × 10 × 10 × 10 × 10 × 10 ×	61618	30.5	SISTS TYPE VOLTAGE RANGE	PARAMETER RANGE SCALE FACTOR	SCALE FACTOR				
•							-	-	-
7 511-13 766	6(394	-	46639 1 0 TO +18-32V				-	-	~
ISTA CE F.46	9639*	-					**		-
44 1 TEALDER OUT 46011	46611	'n					120	126 8 1024	1024
	F 5 0 5 4	;;	45053 10 +-12 VDC						

4 5 0 TACANAB/AR4-118	TACAN	AN/A	84-118		00100				
STONAL NATE	SIGID	TYPE	SIGIO TYPE VOLTAGE GANGE	PARAMETER RANGE SCALE FACTOR RI	SCALE FACTOR	RESOLUTION	OUAN	OUAN U/R B/R	8 / B
100 Set 100 4 46:07 10 +-5 VDC	46507	10	70A \$**				35	32 16 512	512
		:					32	32 16 512	515

65 p.	WALTIN 34	3 21L	HE AUTOMATIC CINECTION FINDER ANZAUF-73	AN/ASF-73	LOUN:			
SISTAL TANS	61617	3446	SIGIN TYPE VOLTAGE RAVGE	PARAMETER RANGE	SCALE FACTOR	PESOLUTION	NYOO	8/n
PLA JOST OD PY	47662	ır.					=======================================	~
BY .C.450	47035	o					:	•
SA. C. L.C. AS	47037	ø.					:	•
F C0-3148	47938	•					:	•
SY: CH-0 2	47019	σ					:	•
SA CHED C	4704	ø.					2	•
,	•						.,	11 16

•	0	TA ACTO	) )   E	4 7 0 HF AUTOMATIC CIRECTION FINDERSONNESS	62-104/84			2	4 6/11	à
SESTAL MANE		01918	341	SIGIO TIPE VOLTAGE RANGE	PARAMETER RANGE SCALE FACTOR N	SCALE FACTOR	KE SOLUTION		<b>5</b>	6
FU1CTION SEL	305	47667	3	FU.CTIO: SEL ANF 47667 4 0 VGC/+10 VGC				-	~	
								-4	~	

	8/2	14 32	1 8
	OUAN	14	-
	RESOLUTION	12 ARC 414	42
INPLI	SCALE FACTOR	1056/056	OPEN=CONTROL
A4/ARA-10	PARAMETER RANGE SCALE FACTOR	0 10 368 016	<b>V</b>
4 . 0 UHF AUTOMATIC DIRECTION FINDER ANJARA-4.0	SIGIO TYPE VOLTAGE RANGE	49042 9 11.8 VAC	3 OPEN OR GLA
ATIC	3486	•	
F AUTOM	81610	24064	*006+
0	Cart levils	ANTER A SERVING	SEISITIVITY COMPHOL 48004

•	UMF AUTO	P371C	DIRECTION !	4 . G UMF AUTOMATIC DIRECTION FINDER ANJARA-90	/ARA-90				
Sawe Traction	01218	TYPE	SIGIN TYPE VOLTAGE PANGE		PASANTTER RANGE	SCALE FACTOR	RESOLUTION	<b>907</b>	*
ATTENDA SELLEMING		~	48A17 3 OPEL OR GA.D		<b>4</b> 2	OPENEND SELECT	44	~	•
ADF EIAB_E	43021	~	3 CPEN OR GND		44	OPERANO ENABLE	¥2	-	•
ADE TIME CONSTANT	46064	r)	OPEN OR GLO	ç	4.1	OPENENO TO	NA	-	•
	600v#		S OPEN CR S.		4.1A	OPENIA O PONER	NA NA	-	•
CHAT FL SJARD CA.	46010	m	3 OPEN OR SKY	52	4 2	OPENEROT ON	4.5	-	•
CHATTEL SELECT LOGI 43012	21064 1	*	OPEN OF 28 VOC	e voc	Į. A	OPEN=NOT SELECT	W.	-	•
CHATTEL SELECT LOSI MATIS	11 4A013		4 3PEN OR 28 VDC		% Y	OPENSANT SELECT	₹ Z	-	•

5 1 0 1	THERANED	UETEC	INFRANCE DETECTION AND MAINTING COLOR			V07 TV 103 PO	200	7/R
Sware Tarabas	01918	TYPE	TYPE VOLTAGE BANGE	PAPAMETER RANGE	SCALE FACTOR			
			4		5VDC=1/6WD=r		-	•
GURE TREVE	51016	-1	+5 VDL		\$49C=1/6V0=0		<b></b>	
ANGEL SEFO	51011	~	+5 VDC		e and the second		~	
PIGHALPA TAREAT 10	51012	н	-5 VDC		31010101010			
12301 0000	51623	-	+5 v0c		5.70C=1/GND=0		•	
TW 3/12 - CAD A	51024	-	+5 VDC		SVDC=1/Sidden			
Alexanda Tatat to	52015	н	+* VPC		3=953/C=340S			
FANGET ACBUISITION	\$1006	3	+5 VOC		5VDC=1/640=0		-	
TANGET ACCUESTION	51022	ŧ	+5 VDC		SVGC=1/6/40=0		-	32
3144.3 = 35.34517	52001	<b>±</b>	+28 VOC - 5ND		26000=1/600=0		-	32
I ASTRON SERTH	52905	3	+29 VDC - SND		28VDC=1/GND=U		•	32
FLAPE VOLLEY III	52004	3	428 VPC - SND		0 0007 7000		-	32
FLART VOLLEY VI	52005	3	+28 VDC + 3VD		28VDC=1/6ND=0		, ,,,,	ic is
II ADMENA GARTE	52303		428 4DC - C+iD		28VDC=1/GNO=0			

0 4 5	THEPARED	DETEC	5 1 0 INFRAMED DETECTION AND MAPHIMG WYSTER		. outeur				
SIS'AL NAME	21610	TYPE	SIGID TYPE VOLTAGE RENGE PAR	RAMETEH RANGE	PARAMETEH RANGE SCALE FACTOR	RESOLUTION	DUAN	, R	•
FLARE STATUS 1	51013	•	51019 * +28 VDC - 6110		28VDC=1/GND=0			•	
ELLIS STATS 2	51016	*	51019 4 +28 VDC - 5ND		28VDC=1/6ND=0			•	
FLAFE STATUS 3	51020	#	51020 4 +28 VDC - 5ND		28V0C=1/6N0=0			•	
CHO - SUN BCY 4 CCOMB 7 SI ERES SON IS			040 / 000		0-085/1-20/46		-	4	

	SUAN UZR P.	*		<b>,</b>
	RESOLUTION			
INPUT	SCALE FACTOR	28VDC=1/6ND=0		28VDC=1/6ND=0
	PASSMETER RANCE			
FLARES DISPENSER SYSTEM	SISIO TYPE VOLTAGE PANGE	51019 4 +28 VOC - 540		4 +28 VOC - GND
SHENS	1405	<b>,</b>		
FLARES D	01818	5101A		£101¢
o		-	,	~
5 2 6	SECRE MANEE	FLESE STATUS	0.0000000000000000000000000000000000000	201-10 3-17

5 , 0	FLARES D	ISPENS	FLARES DISPENSER SYSTEM					;	:	ì
SIENAL NAWE	SISTO	TYPE	SIGIO TYPE VOLTAGE WAVEE	PAVGE	PARAMFTER RANGE	SCALE FACTOR	RESOLUTION	₹ 0	<b>*</b>	<b>5</b>
ONS - DOV AC+ profitores a lineary of the statement	.000	3	+28 VDC	O N G		28V0C=1/GND=0		-	32 32	ñ
מוסאבייסב בר ביייסבר		•	0NB - 707 RC4 - 8ND	OX 8		28VDC=1/6ND=0		-	32	ž
FLAFE VOLCET	36000		ONS - DON BOY W	Q.S.		28VDC=1/6ND=0		•	32 33	iń
FLARE VOLLET 111	2000	, ,	52005 4 +2A VOC - 5ND	0N: -		28V0C=1/GND=0		-	32	'n
Car of the second of the secon		٠ .	, , ,	2		28VDC=1/6ND=0		-	33	m

5 m	PACA PACAP	INC	RAJAR HOMING AND WARNING SYSTEM ANZAPR-36/37	AN/APR-36/37	INPUT			
Cart Spring	olvis	3 Y P E	VOLTAGE PAYGE	PARAMETER RANGE	SCALE FACTOR	RESOLUTION	SUAN	U/R
۱ ا	53.01		:15 VAC	۵.٬	OPEN OR 115 VAC	NA		~
70.76	53392	-	115 VAC	NA	OPEN OR 115 VAC	a N	•	N
CART CITY	5.507.3	•	115 VAC	41.	115 VAC OR OPEN	1.A	-	7
ACTIVITATE ACCE	5 \$ 900	~,	25 700	NA	25 VDC OR SID	a z		7
1811 17 17 18 1	81275	'n	CARING	E.A.	REGUND OR OPEN	NA	1	8
ACTIVITY (INTERTOR)	40263	n	680940	NA	GROUND OR OPER	NA	1	2
(H014216,11)-5 'k1	28407		6460710	i.a.A.	GROUND ON OPEN	11A	1	~
ASSE ALISTED	19085	~	GWADS	NA	GROUND AND OPEN	<u>د</u> 2		~
Great Arteria	53082	~	вносчо	NA	GROUTED AND OPEN	ΑN	1	7
6427 12.787	53054	<b>«</b> )	อสาดเหย	NA	GROUND AND OPEN	NA		8
1821 1211	<b>306</b> 6		GROUND	21A	GROUND AND OPEN	e 2	1	~
C1. 127P	53079	~	g40ย <b>ก</b> ฎ	411	OPEN AND GROUND	A S.		7
ومعن	53363	<b>~</b> ∩	อหต่อหอ	AA	GROUND AND CPEN	42	-	8
C#77 (3) 787	53065	ю	GROUND	r s	GROUND AND OPEN	<b>4</b> 2	-	7
grade dake ched	19061	٣	SROUND	71 A	GROUND AND OPEN	<b>4</b> 2		~
0 P. S. C. L. & 49	5306A	r	GROUND	2.4	GROUND AND OPEN	A N	1	N
CHAP C P TRAP	53969	<b>#</b> )	GROUND	ПA	GROUND AND CPFN	N A	-	8
GEAL VESTALO	53070	•0	скоича	42	GROUND AND OPEN	<b>d</b> 2	-	ο.
Cir Leo	53071	м	ONAGES	<b>4</b> 2	GROUND AND OPEN	¥ 2	-	~
والأدراق الدساء	53073	٠	₩	AN	OPE' AND CLOSE	NA		7
TG1 STP	43074	•0	GROUND	4:	OPEN AND GRAUND	₹ 2	-	8
5 1845	53075	m	SHOUND	AN	OPEN AND GROUND	NA	-	~
ACTUINTY LAW	53076	М	счоилэ	NA.	OPEN AND GROUND	<b>d</b> 11		~
d. 5 J	53077	M)	GROUND	A S	OPEN AND GROUND	<b>4</b> Z	-	~
30 to 60 S	5307A	ю	GROUND	44	OPEN AND GRAUND	118	#	8
45 OFFLECTION	53046	Z.	0 TO 25 VDC	AN	4	S	11	16
225 TERLETTON	43087	E)	0 TO 25 VPC	NA	NA	s	11	16
315 "FF_ESTION	43056	'n	1 19 25 VAC	44	NA.	S.	11	4

	8/8	176	176	176	176	176
	R/0	11 16	16	16	16	16
	OUAN	11	11	11	11	11
	RESOLUTION	ın	<b>s</b> n	<b>r</b> c	N.	<b>s</b> n
10dri	SCALE FACTOR	V.	N.	44	N.	A S
AN/APR-36/37	PARAMETER RANKE	N A	<b>4 2</b>	Ą	NA	AN
RADAR HOSING AND MARNING AMMINGAR/APRING/UN	SIGIO IYPE VOLTAGE RANGE	5 n TO 25 VGC	5 0 TO 25 VGC	5 0 TO 25 VOC	5 0 TO 25 VIC	S 0 TO 25 VEC
RADAR HOM	Sicio	53089	53095	53096	53007	53098
C p.	Base Tracts	135 MEF_ECTION	45 CEFLECTION	225 CFFLICTION	315 CEFLECTION	135 DEFLECTION

1	8/8 #	~	~
	8/8 8/8	1 2	2 .
	OUAN	-	••
	RESOLUTIO"	4 Z	NA
	SCALE FACTOR	115 VAC OR OPEN NA	GROUND AND OPEN NA
.AN/APR-75/37	PAGAMETER RANGE SCALE FACTOR	и	4
RADAR HOWING AND WARNING SYSTEM ANZAPR-35/37	SIGID TYPE VOLTAGE 9ANGE	7 A	CALLOR A STATE
11.6 A	TAPE	,	
RADAR HOW	01918	00019	V
0 #.		•	376
	3644 164238	•	115V 60346

7 1 0	INSTRUME	NT AND	INSTRUMENT AND ATACRAFY SYSTEMS		INPUT				
Ichal hant	81619	TYPE	SIGEO TYPE VOLTAGE RAYGE	PARAMETER RANGE	SCALE FACTOR	RESOLUTION	OUAN	N/8	8/8
SELF TEST	23013	m	23013 3 GROUPID	A	OPENEND SELF TST	A A	-	1	•
TE3T	23615	<b>#</b> )	S CROUND	<b>4</b> 2	OPENENO SELE TST NA	4r4	#4	•	•
TEST	23053	₩.	3 630040	42	OPEN TO SELF TST	NA		1 8	•

	QUAN U/R B/R	11 6 88	11 8 88	16 8 128	11 0 65	11 6 88	16 8 128	11 9 88	11 8 88	16 8 128	16 8 128	<b>8</b> 0 €0	1 6	1 0	1 8	1 8 8	1 66
	RESOLUTION																
TEIGTUO	SCALE FACTOR																
	DARAMETER HANGE																
INSTRUMENT AND AIRCRAFT SYSTEMS	STATO TYPE VOLTAGE RAMGE																
ST AND	TYPE	so.	v	10	d t	ν.	10	'n	'n	3.0	10	:O	ю	м	'n	M	'n
INSTRUME	81610	16015	22015	16014	15018	15019	16017	16022	16023	15020	16021	16933	16034	15035	16036	16537	16038
0 1 4	STORM HAROTS	Cases alv	CFE SPEED	101	C3% S eIF	(356) 414		SCHIESE VELOCITY	SESTICAL MELOCITY	ALT: IFE	411115	EFCS LARVING (P)	EFCS ALPNING (C)	EPCS LARVING (P)	(3) 9\1\1\1\1\1\1\1\1\1\1\1\1\1\1\1\1\1\1\1	EFIS ARENING (P)	EFES - ARVING (C)

9	KAULD AL	20.00	MACLO ALIS TO MANTENIANI STATEM						
STOCAL NAME	SIGIO	110[	TYPE VOLTAGE PAYGE	PAPAMETER RANGE	SCALE FACTOR	RESOLUTION	BUAN	Z/3	•
400 MZ MARKER BEACH 41072	41072	•	GND/OPEN		GND=1/OPEN=n		-	•	
13FOHZ MER SEACH	41073	m	6ND/OPEN		GND=1/OPEN=n			•	
BOCCHE MAR REACH	41074	~	V340/0NU		GND=1/OPEN=A		-	•	
456 HZ HARAEN PEACH 41769	1 .1169	•	GND/OPEN		GND=1/OPEN=n		-	•	
19-342 343 FEACS	41679	m	GNDZOPEN		GND=1/OPEN=n		~	•	
SCHOOLS MAY BEACH	41071	m	6:20/0PE!!		GND=1/OPEN=n		-	•	
400 HZ HBRAER FEACH	1 41051	n	611D / 0PEr.		GNO=1/OPEN=A		-	•	
1310 -2 449 HELCII	41952	m	CND/OPEN		GND=1/OPEN=n		-	•	
3000 42 449 3EACON	41053	'n	GI:D/OPEN		GND=1/OPEN=n		~	40	

01 6	ICAMST PROCESSON 1	SS 300	DH 1		INPUL				
t. 1	SIGIO	TYPE	VOLTAGE RAMEE	PARAMFTER RANGE	SCALE FACTOR	RESOLUTION	N <b>A</b> D	Z .	8 / B
	60050	-			GND=TRUE			~	~
	04030	-	26 VDC		2AVDC=TXUE		-	~	~
	1 6001	-	ı				-	40	•
	13003						••	•	c
; ;	13005						-	•	•
1	13007	-						ø	•
ا . ر	13609							•	æ
	13011	-					-	•	•
::	13013	-1						•	•
	1 1015	~					<b>.</b>	<b>5</b>	••
26 tal 600 Cft 1112	13017	7					-	<b>e</b> o (	•
25 VIC RPC CTL 1112	13019	-					<b>-</b> 1	•	•
25 110 890 OTL 1112	13051	-4					, .	en (	<b>s</b> o (
21 19 16 24 24 41 41 41 41 41 41 41 41 41 41 41 41 41	13023	~					<b></b>	<b>.</b>	<b>1</b> 0 (
26 30 010 1113	1:025						,	•	E (
26 700 690 010 1113	1 * 0.27	-					м ,	<b>.</b>	0 (
25 400 FPC C11 1122	13629	1					en (	<b>10</b>	<b>1</b> 0 (
28 OF ANY OFFICE	1361	-					ra (	<b>10</b>	•
20 100 01 400 CTL	13053	•					- ·	0 4	•
23 100 N2 PPC 61L	15035	-					-	• •	
JTD DWG TEB 171, 45	13037	-					٠.	•	•
28 VOD UTL TPC CTL	13039	-1					•	•	•
23 VOC CT. THE CTL	1 1001	-					<b>-</b>	•	•
29 VIC RF RPC CTL	13043						<b>→</b> ,	•	• •
22 JUC 247 RPC CTL	13045	7					-	•	•
24 475 18 49C CPL	13047	-					-	•	•
28 10C 12 4/C CTL	13049	-					<b>-</b>	•	•
28 800 837 440 616	15051	-					-	•	•

9 1 0	IDAMST PROCESSOR 1	Poct 55	OR 1		INPUT			
SECTIVE SECTION	81610	TYPE	SIGIO TYPE VOLTAGE RAVGE	PARAMETER RANGE	SCALE FACTOR	RESOLUTION	4 C P P	R/0
28 VIC OIL RPC CTL	13053	~					-	•
29 VOC OIL APC CIL	13055	-					-	•
28 VIC FF APC CTL	13057	•						•
3PH 114VAC APC CTL	13659	-					-	•
29 JOH HAC CTL 210	13061	-					-	•
26 LAC ROC CTL 210	13063	-					-	•
3PH 115V4C RMC CTL	13065	-					<b>-</b>	•
3PH 115VAC RPC CTL	13067	••					-	•
3PH 11544C HFC CTL	13059	-					-	•
29 VOC RPC CTL 230	13073	-					-	•
IFH ITSVAC APC CTL	13071	-					-	•
28 470 RPC CTL 239	13075	7					-	•
39- 115VAC RPC CIL	13077	-					-	•
26 VAC RPC CTL 240	13079	7					-	•
21 29 VOC 62 CTL 240	13081	-					-	•
3PH 115VAC SPC CTL	13083	-					-	•
28 VEC 496 CTL 259	13095	-					-	•
26 VAC FOC CTL 250	13687	-					-	•
3PH 115V4C RFC CTL	13049						~	•
28 ¥20 490 01L 260	13091	-					-	•
28 VOC RPC CTL 311	13093	-					~	•
3PH 115VAC RPC CTL	13695	-					v1	•
29 VOC RPC CTL 330	13097	-					•	•
29 VOC KPC CTL 340	13099	-					•	•
28 VOC RPC CTL 360	13101	-					-	€0
25 UCC HOC CTL 370	13103	-					-	•
28 VSC RPC CTL 380	13105	#					~	•
115 VAC 475 CTL 360	13107	-					-	•

	IDA*ST PRCCLESUP 3	PCCE \$5	1 co		LOUNT				
Sast Tatols	SICIA	* Y 2 E	VOLTAGE PAMGE	PARAMITER HANGE	SCALE FACTOR	RESOLUTION	NAUG	Z/2	2
160 710 DEM DOS 62	.3109	*1					-	•	
28 100 890 011 392	13111	-					4	•	
23 VOC 630 CIF +11	13113	•1					-	•	
20 000 470 016 4111	13115	-						•	
28 YES HAS CTL -2"	13117	r. <b>4</b>						•	
26 446 490 616 429	13119	-1						40	
3Pd 115yet Fac CTL	13121	٦					-	•	
28 450 645 0ft 430	13123	-						40	
23 VOC 330 CTL 450	13125	н					-	40	
28 VOC 890 CTL 460	13127	-					1	•	
55 120 400 616 460	13129	-					**	•	
115VAC ROC CTL 460	13131	-	•				1	40	
524 710 DES 004 62	13133	-					-	•	
28 105 905 CTL 450	13135	-					-	•	
26 14C 83C CTL 460	15137	<b>+</b>					-	•	
115020 RPC CTL 450	13139	••					g-1	•	
29 550 PPS CTL 511	13141	-						40	
23 130 450 CVL 512	13103							•	
28 VCC 490 CTL 513	13145	-					-	•	
23 400 APC OFL 514	13147	1					-	•	
23 JCC 43C CFL 520	13149	н					-	•	
IISAAC KOS CIL 531	13151	-					-	•	
29 VCC 49C CTL SCP	13153	-					#	•	
1154AC ROC OFL. IMK	13155	-					-	•	
11548C 42C CTL IPK	13157	-				•	<b>.</b>	•	
HAT TAD DES DON RE	13159	-					-	•	_
28 VOC 92T CFL IFR	13161	-					-	•	_
3PH 115142 SPC CTL	1 3161	_					•	•	

0	INAMST PROCESSOR 1	CE 55(	JR 1		TUGNI .	200	3	•	-
3	SIGIO TYPE		VOLTAGE RANGE	PARAMETER RANGE	SCALE FACTOR	RESOLUTION	¥ 00	¥	
13169	aŭ.	-					-	•	
13167		-					•	•	
13169	•	-					=	•	
13171	_						-	•	
13173	•						-	•	
13175	<b>I</b> D	-					-	•	
13177		-					-	•	
13179	σ	-						•	
12141		-					-	•	
13193	ŧņ.	-					#	•	
13195	ŗ						-	•	
13167			٠				-	•	
13159	66	-					-	•	
13191	<b>.</b>	-					~	•	
13193	m	-					~	•	
13195	č	-					~	•	
13157		~					-	•	
17193	2	-					~	•	
13201	11	-1					•	•	
13205	<b>1</b> 0	-						•	
13205	ň	-					-	•	
14207	7.	-					-	•	
13209	6						-	•	
13211	-						-	•	
13213	wn.	-					-	•	
13215	w <sub>j</sub>	-					-	•	
13211		-					-	•	
1221							-	•	

ITON QUAN U/R B/R	1 3		1 8 6	<b>₹</b>	* * * *	40 40 40 40 41 44 44		***************************************			
OR RESOLUTION											
SCALE FACTOR											
PARAMETER RAYAL											
LTAGE RAVGE										10	6
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SIGIO TYPE VOLTAGE RANGE	1,521	13223 1	15225 1	1 1557	13229 1	13231 1	17253 1	13235 1	13237	FL CTL 14 31 00T 1 25052 1	65108

ю н я	ICAMST FACCLSSOC 1	SS JJJJ	1 30		OUTPUT				
5000 Te 25	SIGIC	TYPE	VOLTAGE RAYGE	PARAMETER PANGE	SCALE FACTOR	RESOLUTION	8CAN	۲,2 هراي	# / A
19-500 \$6 H\$ 95 CT	1009	•					-	-	*
באייטטר זי צאים ינו	1010	~					-	-	-1
THESOM LE MUSICION	1101	•					-	-	**
27-300 BC F	1:15	er,					=	~	-
ALTE SWID	10001	'n					<b>-</b>	-	-
88376 #27 3#2#	: 3002	•					-	-	
AUT CARA TORES	10003	ň					-	4	-
we are one in	11600	P)						-	-
ול נישוים	11510	•					-	-	-
TE SOLE SET AL	11011	•					-	-	-
71.41.67.23	11012	•5					-	-	
16 stp 14. 44	11913	r)	٠				-	-	
LE (1) 113 14	11014	n					-	-	-
זי, אר 19 בני בור בין אר 219	11315	n					-		-
74 . 12 6 3 31	11616	m					-	-	7
er to the total of	14015	m					-	-	-
(A. 1.63)	14-94	•	へましましむ				11	-	11
1 . 1 61. 377	1.911	€0	6.8V				11	-	=======================================
E . 1 5.324EAT	14017	r						<b>~</b>	-
EST 1 AFT VACELLE	14619	'n						<b>-</b>	-4
372201 1 013	14721	•					1	-	-
F16 2 MEVERSER	14016	'n					-	-	
153 2 547	1.010	٠	AE0#-6				11	-	11
FAC 2 CIL STY	14912	•	×8.9				11	-	11
TABLESO S OLS	14018	~						-	-
ELC 2 AFT VECELLE	14020	41					н	-	
£46.2 PG22.E	14022	m					•		-
\$39c TO T 5c3	14013	€	9.9-17.90				11	~	22

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O .d en	ICHAKT PRUCESSOR 1	PRUCE SE	SOR 1					9	ģ
Tave Tave 15	<u>:</u>	Lake Cirix	CLTAGE SANGE	PARAMETER RAUGE	SCALE FACTOR	RESOLUTION	2400	ž	*
· 2 · 4 · 4 · 4 · 4 · 4 · 4 · 4 · 4 · 4	14623	í	V76.4.5				::	æ	22
8 . 2 (1 30 t S	11016	n	9.9-17.90				11	~	22
	5037:	0	A26.4.0				11	~	22
for the trace	15027	^					11	~	25
title alt tenb.	. 4	•					11	~	25
Carlo Control	15041	•					11	~	22
* ** ** ** ** ** ** ** ** ** ** ** ** *		^					::	~	22
4	0.04	•					11	~	25
STATE ATP TAMP.	101 32	<b>p</b>					11	~	25
5	10.47	::	0-1.5v00				10	4	<b>9</b>
1, 110 a re 24	7,007	11	9-1.5vac				01	₹	40
	12601	ŋ	7 3UA 5*82-9				11	40	8
• • • • • • • • • • • • • • • • • • • •	60077	æ	33A 5*1.2-1				11	€0	8
*0 000 Tale 0	12003	er.	364 8 4 45 A				11	90	8.9
:, :, .,	10001	Đ	7*2**5 VAC				11	•	88
F. 11 17 24	u) c: c:	3	354.5.45e				11	60	ec.
6PC STATUL 111	1 13962	<b>-</b> )					-	80	•
ALL STAIDS DON	13004	r)					1	•	•
911 5019.5 20-	50061 9	n					-	•	•
RPC 5747JS 115	5 11008	€.					-	•	•
FPC STATUS SCA	61361 2	m					1	•	•
900 STATUS 128	1 13012	•						•	•
420 Status 126	1361 9	•					-	•	•
SPE STATUS 11	1111 13016	m					-	•	•
\$1 5£17£ 3d4	1112 13010	<b>*</b> )					1	•	•
PPC STATUS JC9	1112 11620	•						•	•
RPC STATUS 11	1112 13022	n					•	•	•
RPE STATUS 11	1113 :3424	*1					-	•	•

2. WW TSHOIS		C1918	TYPE	SIGIO TYPE VOLTAGE RANGE	PARAMETER RAYGE	SCALE FACTOR	RESOLUTION	OUEN	8/n
RPC STATUS	1113	13026	'n					-	•
SETATUS	1113	13028	m					-4	•
RPC STATUS	1122	13030	۳					-	•
An Pac STATUS		13032	ĸ					•	•
MI RPC STATUS		PROST	ĸ						**
M2 RFC STATUS		13036	<b>K</b> )						•
SUTER STATUS		1303A	m					-	•
SIL PPC STATUS		13640	m						40
OIL ROC STATUS		1:042	*					-	•
لالد محن علايدات		かからかせ	ю					•	•
AN, AND STATUS		13646	M°)					-	•
AL APC STATUS		13048	•					1	•
STATE STATUS		13750	•0					#	€
ב בפי קיים אונדעטא		1:052	3					-	•
811 - 2C STaTUS		13054	*0					-	€0
GIL PPC STRTUS		13756	<b>™</b> )					-	•0
Satats Sia 98		13058	ю						40
SC. TEL Deg	213	13060	ĸ						•
APC STATUS	210	13662	*1					-	<b>6</b> 0
PPC STATUS	510	13044	m					1	•
R.P.C. STATUS	210	13056	m					-	•
RAC STATJS	5:0	13968	~					-	•
RPC STATUS	230	13670	•						40
TEC STATUS	630	13074	m					-	•
SETATUS	230	13072	'n						•
FPC STATUS	230	13976	×						•
PPC TATUS	240	13078	*O						40
PDC STATUS	5+0	13030	ю					**	•

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	N/N	•	40	€0	80	n	40	•	æ	60	60	ю	•	•	60	æ	60	40	€0	40	•	•	60	•	80	•	•	9	•
	DUAN	-		*	-			•	-	<b>#</b>	-	-			•4	-	**		-	7	1				1	H	-	-	•
	RESOLUTION																												
OUTPUT	SCALE FACTOR																												
	PARAMETER RANGE																												
XOR 1	VOLTAGE RAVGE																									•			
ROCESS	id A	ĸ	m	m	Ю	n	ж,	3	٠,	m	#O	'n	8	٣	ю	ю	€0	•	H)	m	<b>(1)</b>	m	m	H)	m	m	m	m	
IDAMST PROCESSOR 1	81610	12092	13084	13096	13068	13090	13092	13094	13096	1,3394	13100	13102	12104	13106	13168	14110	13112	13114	13116	13119	13120	13122	13124	13126	13128	13130	13132	13134	
0		240	250	223	000	263	563	317	\$2°	333	343	340	3.70	0 1 1,	390	161	392	11	4111	425	420	<b>∂€</b> \$	430	453	46.9	169	\$53	470	
9 1	EART TERRET	SETATS 39P	PPC STATUS	PPC STATUS	Silvis Sea	SETATE SHA	SETATE 34:	SUTATE SEA	S717.3 Cae	RPC STATUS	POC STATUS	PPC STORYS	FPC STATUS	Suffer yes	SCITTO DAM	SCISIS CAS	301418 Day	SETURE DAR	SETTLY Det	St 1212 344	SCIUIS Dae	SETTE STAT	SETITE DAY	4PC STATUS	SCIFIE Des	PC STATUS	SCIVIS De	CPC STATUS	

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	4/a	•	•	•	•	•	•	•	•	•	•	40	•	•	•	60	•	80	•	•	•	•	60	•	•	•	80	•	•
	DUAN	w	-4	<b>~</b>		-	<b>-</b>	-		-		~	-	-	<b>#</b>	-	-				-	-		-	-	-	~	-	-
	RESOLUTION																												
OUTPUT	SCALE FACTOR																												
	PARAMETER RANGE																												
OR 1	SIGIO TYPE VOLTAGE PANGE																												
PUCESS	TYPE	n	m	m	ю	ю	ю	ю	m	m	m	<b>#</b> )	m	ю	ю	•∩	ю	ĸn	m	۳,	м	m	ю	ю	•	ю	m	ю	'n
TOAMST PRUCESSOR 1	SIGIO	13139	13140	13142	13144	13146	13148	13150	13152	13154	13156	13158	13169	13162	13164	13166	13168	13173	13172	13174	13176	13178	13180	13162	13184	13186	13188	13190	13192
0 10		00	00	511	512	513	514	520	531	SCP	¥ I	ĭ	¥	ž.	UNSU	OEK K	OFK	¥ F J.	Srx	*PD61	PF062	SCAN	1063	K.P02	FP03	H-101	HUD2	HS01	HS05
8 1	SIGNAL NAWE	SETATUS	APC STATUS	RPC STATJS	RPC STATJS	APC STATJS	SEARIS 295	RPC STATJS	PPC STATUS	ST 1815 236	57111S 244	RPC STATUS	RPC STATUS	PPC STATUS	SHE STATUS	APC CTATUS	30 STATJS	PPC STATUS	RPC STATUS	RPC STATUS	RPC STATUS	PPC STATUS	RDC STATUS	APC STATUS	SETATE JOH	RPC STATJS	APC STATUS	RPC STATUS	SELVIS DAM
														22	23														

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	8 8/R	•	•	80	60	8	•	6	<b>8</b> 0	8	8	e0 e0	e. e.	•	8	9	6	80	•		•	•	2	•	88	8	8 56	<b>%</b>	9 2 2 6
	J. A.	•	~	~	~	~	•	~	~	~	~	-	~	-	7	-	7	~	7	7	-	-	7	7		-	-•		-
	POUAN	•	-	#1		-	-	-	1			-		1	1			•	1	1	1	1	-	-	7	7	1	7	C.E.
	RESOLUTION																												
OUTPUT	SCALE FACTOR																												
	PARAMETEP RANGE																												
OR 1	VOLTAGE RAMBE																								V2-9	n 3V	0-5v	43V	
ROCE SS		٣ì	м	ĸ	ю	m	~	<b>*</b> )	ю	м	m	٣	m	ю	m	ю	М	m	ю	m	m	ю	ю	•	1	=	11	:	
I DAYST PROCESSOR 1	SIGIO TYPE	13194	13195	13199	13200	13202	40261	13206	13208	13210	13212	14514	13216	13218	13220	13822	13224	13226	13228	13230	13232	13234	13236	13238	14005	14007	14006	14004	87173
6		) d : •	2	79.01	1 1	£	ž.	ź.			SEK	Y. N.	STP	*P061	<b>8</b> 5068	SCAR	1001	₹0□4	F.P03	F:001	4002	105=	r.302	MFDC					
a)	Bart Te Cis	effected files	SCTATES COA	SE1418 35-	STATE DAR	Stitis Dee	RPE STATUS	APC STATUS	SCIVIE SET	FPC STATJS	APC STATUS	SETTIS Day	851278 SEA	SE1115 JA	RATE STATUS	Stitis -da	FPC STATUS	SCIATE 394	RPC STATJS	4PC STATUS	RPC STATUS	APC STATJS	4PC STATJS	RPC STATUS	Evc 1 v.1	E16 1 82	£1:0 5 1:1	£86 2 1.2	CTOF BUCKLOSE STATE

0 6	IDA#ST PROCESSOR 1	20 TO 0							
SIGNAL PAME	SIGIS	111.	SIGIO TYPE VOLTAGE PANGE	PARAMETER RANGE	SCALE FACTOR	RESOLUTION	N O	¥/2	9/8
ELEV POS L	11011	16					*	15	224
ELEV POS 2	11016	91					**	:	224
PULLEP POS	11619	18					:	16	224
OUTFOAFD FLP POSILE 11003	11003	18					1.	16	22
(T) SUE GTB CI.	11504	16					*	16	224
USB LEFT	11005	1.8					*	91	224
SPOILFR 1L PUS	11020	19					**	16	224
Sporter at Pus	11021	18					14	16	.224
QUEFORRD =_P POS(R) 11096	11006	18					=	16	224
MIE FLAP DOS(R)	11607	18					**	9	224
SSA PIGHT	11008	1.8					*	16	224
Sports 14 Pos	11022	16	•				14	16	224
SDCIFF 29 PCS	11623	91					**	16	224
THUE SIR SPEED	16524	6					**	32	
TOUR AIR SPEED	16025	•					74	35	9
TALE AIR SPEED	16025	6					14	32	8
FISSION ACCHIONIN	90170	01					215,	3	64 32758

C 2	IDAMST PROCESSOR 2	ROCESS	10R 2		TUPPI .				
SESPAL LANCES	SIGIO	TYPE	SIGIO TYPE VOLTAGE PANGE	PARAMETER PANGE	SCALE FACTOR	RESCLUTION	OUAN	U/R	B/R
LAVO TEST SKOULD	64684	m					-	-	-
LAYE TEST SROUTE	43914	'n					**	-	-
FIRES A POST	43927	'n			6ND=1/0PEN=0		Ħ	-	~
FREG 9 POSM	43028	m			GND=1/OPEN=0		7	-	-
RELAY HETOTA	43025	М			GND=1/OPEN=n		н	-	-
16. FTZP4 (SE MANK	11 400 4	m	ONE & CND				4	4	-
AGEN DOLDGAME AR	13045	n	OND 8 NBGO				<b>u</b> 1	~	-
医乳毒素 计记录数据人物的 医生	43046	ю	OPEN & GND				-	-	-
2K FT/RENTE MAPK	43047	m	CPE" & 6"L					-	-
IX ETZPANSE MAEK	43649	٣	GPS & M3GO				н	-	-
g ADRIACIANS	43019	s	r 10 5 VDC		0VDC=0/5VDC=1			-	-
E ADVICT RES	43020	3	0 TO 5 VDC		0V0C=0/5V0C=1			-	-
STEN SHIP POSITION	43021	3	0 TO 5 VOC		0V0C=0/5V0C=1			-	-
SCHOOL STEP STOURL	43022	*	0 TO 5 VOC		0VDC=0/5VDC=1		94	-	-
FOLLOWER STGWAL	43623	#	n TO 5 VDC		0VDC=0/5VDC=1			4	-
BITF TEST	43054	#	C TO S VOC		0VDC=0/5VDC=1			-	-
SITE TEST COMPL	45025	*	0 10 5 490		0VDC=0/5VDC=1		-	-	-4
#10 C(3937	43631	'n	0 TO 5 VDC				11	-	11
RATHE MARK BAT CONT	43042	'n	9 TO 5 VAC				11	-	==
10-12 FRES SEL 2-04	100%		0/1				-	~	~
10°42 FRED SEL 2**3	34002	-	0/1				-	~	~
19442 FRED SEL 2002	34003	-	1/0				-	~	~
1944Z FREG SEL 1001	4004E 1	-	0/1			/	-	N	~
14HZ FRES SEL 2005	34005	•	1/0				-	N	~
14HZ FRE3 SEL 2**4	34036		1/0				· <b>-</b>	~	~
14-2 FPE3 SEL 2**3	34007	-	0/1				-	N	~
1#HZ F9E3 SEL 2002	34008	-	1/0				-	N	~
1442 FPES SEL 2401	60042	-	0/1				-	~	~

	N/8 8/R	2	2	2	2	2	2	2	2	2	2 2	2		8	N N														
	DUAN	-	#	-	-	•	•	-	-	-		•1	•	7	<b>-</b>		A A A A												
	RESOLUTION																												
IMPUT	SCALE FACTOR															+10VDC=1/0VDC=0	+10VDC=1/0VDC=0	+10VDC=1/0VDC=0	+10VDC=1/0VDC=0	+10VDC=1/0VDC=0	+10VDC=1/0VDC=0	+10VDC=1/0VDC=0 6ND=1/OPEN=0 6ND=1/OPEN=0	+10VDC=1/QVDC=0 6ND=1/OPEN=0 6ND=1/OPEN=0	+10VDC=1/0VDC=0 6ND=1/0PEN=0 6ND=1/0PEN=0 6ND=1/0PEN=0	+10VDC=1/QVDC=0 6ND=1/OPEN=0 6ND=1/OPEN=0 6ND=1/OPEN=0 6ND=1/OPEN=0	#10VDC=1/QVDC=0  6ND=1/OPEN=0  6ND=1/OPEN=0  GND=1/OPEN=0  GND=1/OPEN=0  GND=1/OPEN=0	#10VDC=1/QVDC=0 6ND=1/OPEN=0 6ND=1/OPEN=0 GND=1/OPEN=0 GND=1/OPEN=0 GND=1/OPEN=0	#10VDC=1/QVDC=0  6ND=1/OPEN=0  6ND=1/OPEN=0  6ND=1/OPEN=C  6ND=1/OPEN=C  6ND=1/OPEN=C  6ND=1/OPEN=C	#10VDC=1/QVDC=0  GND=1/OPEN=0  GND=1/OPEN=0  GND=1/OPEN=0  GND=1/OPEN=0  GND=1/OPEN=0  GND=1/OPEN=0
	PARAMETER MANGE																												
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0 2 8	STOAR LANGE	C.1 PHZ F12 SEL 2005	0.1442 F15 SEL 2004	C.14HZ F13 SEL 2003	0.1*H7 F43 SEL 2**2	0.1Pm? F38 SEL 2001	0.91"42 #2 SEL 2**5	0,51"-7 F3 SEL 2**4	0.01 442 FD SEL 2**3	0.01""2 #3 SEL 2**2	1**2 738 62 2mm10*0	8.00 J38E3 2.10.300.3	0.005 WHZ F3SEL 2001	3570c 737.15038 2		160100 118	77. TL 9110 118	0%) (5%5)+914 The Treft -1764	22. 10.019.JT 10.47. STARTLITY FULL PIGH(5AG) CMD SCAY "00.2 ILEFT)	22.  **100.00.00.00.00.00.00.00.00.00.00.00.00.	22.  4047- STABLLTY  FULL PIG4(3AG) CM0  SCA1 **005 (PIGHT)  SCA1 **005 (PIGHT)  ALT CPLA 3AC. 1	40474 STARLITY 50414 PIG4(5AG) CM0 5C44 MOSE (LEFT) 5C44 MOSE (PEGHT) ALT CPLM BALD 1 ALT CPLM BALD 2	### ##################################	### ##################################	40 TO STARTLITY FOLL PIGATORS CMD SCAY WOSE (REFT) SCAY WOSE (REFT) ANT CPLA BAND 1 ANT CPLR BAND 2 ANT CPLR BAND 4 ANT CPLR BAND 4 ANT CPLR BAND 4	### ##################################	### ##################################	4047- STARLITY FOLL PIGH(3AG) CMO SCAY WOGE (LEFT) SCAY WOGE (LEFT) SCAY WOGE (LEFT) ANT CPLA BAGO 1 ANT CPLR BAGO 2 ANT CPLR BAGO 3 ANT CPLR BAGO 4 ANT CPLR BAGO 5 ANT CPLR BAGO 5 ANT CPLR BAGO 7 ANT CPLR BANG 8	### COLP JT  ***OUT STARLITY  FULL PIGHTSAG) CMO  SCAY "OOE (LEFT)  SCAY "OOE (LEFT)  SCAY "OOE (LEFT)  ATT CPLA BALD 1  ATT CPLA BALD 2  ATT CPLA BALD 4  ATT CPLA BALD 5  ATT CPLA BAND 4  ATT CPLA BAND 5  ATT CPLA BAND 5  ATT CPLA BAND 6  ATT CPLA BAND 7  ALT CPLA BAND 7

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•	70 - 121 - 121	26-35	3			7.0m()253		<b>~</b>	æ	80
14: 17 <b>+</b> 0	IBON JOUNGS NGC THO	4 612	3	002N 03 58 40C	A;A	OPFN=YOT SELECT	4.7	-	60	•
ر ۳۰۰ د د ۱	TOCH LUST TO TULL FOOT	48613	7	CPEN OR PRIVIDE	NA	OPPUSED SELECTED	4	-	Ŧ	•
to be desired to the second se	l. 	24149	3	OPEN OR 28 VDC	A S	CONTRACTOR TE MODE	4 2	-	ø	•
	44.47 A44 17EG	9:146	v.	+4.3 VOC 10 0		J. 12. 11. 10. 12.		ä	30	88
C 31 * 5	ALTS* 1211 633*5	71147	ς.	+3.0 VOC 17 0				11	60	88
74034051	,	21149	s					11	•	A.
VIES CO IN	2114	21151	'n	-15 VOC TU 0				1.1	60	88
4 4	STRAND SERVICE STREET	2:152	ď,	+4.3 VOC 10 3				11	•	6
23	一種の存在するました はくじか	46673	v					11	<b>6</b> 0	88
	(Eliator (*CEFT)	46074	ລ					11	60	88
101+3 (5+3/5)	(+13)	46075	u)					11	Ф	80
1191197	CEMBIONING LATERIA	44675	S					11	•о	8
12: CAS .		44.077	'n					11	æ	e) e
HIND FLAG H	F 51	46078	n					11	æ	88
C=1 CC		46079	so.		-			11	<b>e</b> r	<b>6</b> 0 60
3***C		46190	ď					11	æ	89
g		45081	'n					11	€0	<b>©</b> ₹
4 - 26 -		46022	'n					11	80	88
es lites	MILL SQUELCH ADU HE	39003	۰.					11	<b>6</b> 0	€
58 11 W	MAIL SQUELCH ADD CT	#006£	٠					11	•	
3 36045	TH CC# ES Decis	\$9008	٥					11	€	88
8 63779	GUILD SE AND CT	39006	9					11	80	99
, .I ч.	THI COR HEDSON LIVE	39050	æ					11	60	9
PS 77.59	MATE SQUEEZH ARU CT	15.68	•					11	•	99

ວ ≥ e	TOAMST PROCESSOR 2	OCES	Sc# 2		IMPUT				
SIGNAL NAWE	51610	TYPE	SIGIO TYPE VOLTAGE RAVGE	PARANFTER RANGE	SCALE FACTOR	RESOLUTION	CUAN	2	à
SULP SO ADUMI	39052	•					::	•	•
SUMPLY SO ADULET	39053	•					11	•	•
FILOT HSI (F)	24028	6					:	•	11
PILCT 3341 8	24119	•					*	•	11
50*PASS K	9609 <del>1</del>	6	26 VAC 400HZ				*	•	=======================================
# 15 m 250	46049	•	26 VAC 4004Z				*	•	7
SC24 (12)	80165	10					512	•	60
3550 (173)	R0009	10					16	Ф	72
** 410)	80033	10					16	•	12
128 1 (14)	30017	10					32	60	22
14. 2 114)	801121	10					32	•	22
INC STABOL (IN)	80013	10					96	•	76
2 کرد. ۵	21042	*	9 000				~	16	-
391.50 D1S <b>35</b>	21085	60					11	16	17
51C . FPT4	21086	'n					11	91	11
HCAR GAIN	21087	ď					11	16	7
153-FOND SEVEL	21126	S					11	16	1
AZ 5,76- (\$78)	16312	1~					:1	16	7
AZ ST#8 (COS)	21594	7					11	16	7
ALTITUDE	21134	1					11	16	7
25 44 112	21134	1					11	16	11
TILT CONFACE(X+Y+Z)	21015	6					\$	16	22
GABESHIV L'EL	26001	•					14	16	22
TELLET CONTRUL A	46507	10	+-5 VDC				32	16	2
TELLANT CONTROL B	46008	10	+-5 VDC				32	16	51
PHOTO PC49 DUTPT	43036	11					7	91	Ξ
Ray 35 * 444	43037	11					,	92	=
AZ CU-503 (SI'4.COS)	21122	19					<b>*</b>	16	3

	0 ~ 4	ICA*ST PROCESSON 2	POTESS	2 u0:		TUPUT				
	String same	21815	4.7	SISID TYPE VOLTAGE RANGE	FARAMFTER PANGE	SCALE FACTOR	#650LUTTO*3A	QUAN	8/2	8/R
	HUT CFF FATURU HTW	25171		36A \$ 40 3	۸.	OPENHUD ON/OK	หล	-	32	32
	1810 4 STAB	21063	•	ב אשר ב		מונים מסשבתונים		1	32	32
	Ido dwit Stieutoes	+3695+	٠						32	32
	MCILOSTEE X	43055	۵					11	32	352
	161122 F	48384	•					11	32	352
	MIS HICLY WINDER	21045	u:	-1.2V TC +1.2 VAC				1.1	3.2	352
	800 74021 174-48	310.46	ч	2 70 2.2 Vac				11	3.2	352
	57: EMT 9 C#35 1	16003	6.4					0	3.5	2560
	5 < U#3 C+15 · · ·	3 6 6 6	Ð.					0 €	32	2560
	80 (CAC) (CAL + 404)	15609	9					36	32	2560
	( · · · · · · · · · · · · · · · · · · ·	28232	10	224 S 20 v	<b>4</b> 5.	NA	A S	128	33	\$60\$
	CH OF S HERS	29223	10	2 08 5 VPC	<b>4</b> %	NA	N.F.	91	32	512
2	21 37 - 6.10	+ 3250 €	10	3 08 5 VOC	NA	a s	N A	16	32	512
36	1818 4843Y	24225	; <del>,</del>	9 08 5 VAC	4.2	KA	h.1	16	22	512
	*CA4** **A8.3	28224	٦ 1	O GR S VOL	< Z	NA	νA	16	32	212
	¥20 70 8247	28227	10	0 0 8 VOC	N.A.	NA		16	32	512
	>2170 F.L.	20020	2,1	0 08 5 VAC	44	NA	n. A	9 (	32	512
	(\$35**15) 5 to 212*	21944	ď	0 TO 18 VEC				7.	32	40 27
	(82) 1 0.2*	10705	c.					512	99	32768
	(**) : : ca	*6.0	91					215	94	32768

0 4 8	ICAMSI PROCESSOR 2	80330v8	S 40		00,1991				
er se di diference	21515	30.4	TYPE VOLTASE PANSE	PARAMITER RANGE	SCALE FACTOR	RESOLUTION	OU A	g / 2	8/R
1C (6)	15003	ĸ,					-	~	C.
(e) 3:1-face	15004	€:					-	~	8
(A) 130 s	15195	₩,					-	~	8
Add the Cathedry	15006	1)						~	~
CELECTATOR (P)	15007	'n					н	~	N
HYTHE ILIT IPI	15009	9					-	~	N
CENTER AISLE (F)	15703	۳,					-1	CV)	N
(6, 5, 6)	15010	ю					<b>-</b> 1	~	~
CA TISS RECALLING	1251	r						~	٥
TINI HASIC ON SUFFE	25015	10					208	~	416
CALCACTORSOLATERS	26003	10					192	~	384
FT 512	32028	~	-5 VDC/+10 VDC		-5VDC=R/+10VDC=X			N	~
(f) (c) (f) (d) (d)	32327	х	+10 VOC/-5 VOC		-5v0C=R/+10v0C=x			N	~
PUS TO-TALK	3405E	£	SMEZOPER				-	~	N
TH: 175427 456	43602	٣	20A S 01 0					~	N
27 FEEE 100	20054	•	2 TO 5 VAC					~	~
13 30 LC3	\$306	્	3 10 5 036				-	8	N
907 6,47 6315 <b>4</b> 4	40064	m	0 10 5 400					~	~
ومجتوع المئالون	43005	69	0 TO S VDC				-	~	N
APIT HILLPY UP CTL	43034	m	ז ייטכ		GND=1/OPEN=n		-	~	~
AND BUILDING LO CTL	43054	m	5 400		GND=1/OPEN=n		-1	~	~
AMIT POLLUP LP CTL	00067	ю	5 VOC		GND=1/OPEN=4			~	~
TAD OF BACCOAS ATAK	43092	ю	S VDC		6ND=1/0PEN=4		-	7	~
XMIT LETDOAN LP CTL	16081	ю	אייכ אייכ		GND=1/OPEN=0			~	~
XMIT SLOADY LP CTL	43196	m	5 VOC		GND=1/OPEN=n		-	8	~
XMIT LETURY LP CTL	43098	۳,	5 VNC		6ND=1/0PEN=0		-	N	~
RF CCVT#3. AM	47002	s					11	~	25
Enst LIGHT	21137	•	26 VOC				-	~	~

	9 2 û	IDAMST PROCESSOR 2	SSSSO	> ₩.		SUTPUT				
S	SISHAL HAME	C1915	3 46 8	VOLTAGE RANSE	PARAMETER PANGE	SCALE FACTOR	RESOLUTION	4 O	۵ ۲	8 X
<b>3</b> .	59/16 LAWS ATH	21103	m					-	•	•
-	101/20 Lamp FF4	21154	m						•	•
• 1	S-35/5 LAYS HTM	21165	m)					-	•	*
<b>A</b> F1	3-37/1 LA*2 KTN	21165	*1					<b>~</b>	*	•
~	246/37 LAMS RTM	21157	FC					-	*	•
œ	83/5 LE-3 4TW	21159	ю					<b></b>	•	•
,	*AG HEADING HAD	25529	-	+28 VDC		28VDC=TRUE		-	•	•
ı	AANGE TO DEST UNITS	25023	6		6/0		1/2 MILE MR	2	•	26
ŗ.	PAFEE TO DEST TENS	25A24	6		06/0			7.	*	36
:x	RATUS TO DEST HURDS	25025	σ	-	006/0			#	*	36
13	DEST JEL PERYTIG	25326	o.		3/360 DEG	1056=1056	930 \$	1.	#	\$6
1	PAR 4580143	25027	6		0/360 DEG	1056=1056	S 0E6	<b>*</b>	*	26
	אטכ ביוור	27110	~	3 08 5 VDC	A Z	DVDC=AUC OK	d Z	-	•	•
30	GATE AD (TRUESCOMP)	21032	31	n CP 5 VGC	NA	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	N	160	32	5120
S	SERVE FAILED	21074	ç					::	æ	8
4	ATTIT-UDE 5000	25052	7	4/C+28 VAC		28VDC=TRUE		-	•	•
د	UME ANDID CHIRL	36043	ĸ	CPEN 28V CLO GND				-	80	•
*	400 HZ MARKEN PEACH	41075	ĸ)	M3407GH3		GND=1/OPEN=n		-	•	•
-	1309-2 YEE REACH	41076	ю	GNDZOPEN		GND=1/OPEN=n		-	10	•
*	3000mZ 149 BEACH	41077	m	M3407075		GND=1/OPEV=n		-	•	•
:#	400 HZ WARKEN PEACH	41081	٣	G-10/OPEN		GND=1/OPEN=A		-	•	•
-1	1335HZ KKR PEACK	41092	*	64D/OPEN		GND=1/OPEN=n		-	•	•
<b>=</b> 1	SOUTHE MAR PEACT	41093	ĸ	GND/OPE#		6ND=1/0PEN=0		-	•	•
40	# 67.10 G. P.	42035	6					*	•	112
ıc	636 patr 5	42037	σ					2	•	112
a	PANE HATE SEA CCNT	43345	'n	0 TU 22 VEC				:	•	8
vi	SERIAL DATA CUT	46053	10	+-12 VPC				120	•	1024
s	1 0000 kg	47036	σ					7.	•	112

6 2 6	ICAMST PROCESSOP 2	CESS	OP 2		OUTPUT				
11 JAKE 1245	81510	1406	VOLTAGE RANGE	PARAMTER RANGE	SCALE FACTOR	RESOLUTION	OUAN	8/2	B/B
k	477.37	•					<u>.</u>	60	112
A 56.437.45	47034	6					*	40	112
2 0.40 kg	47039	σ					7.7	40	112
2 3.73.45	0+32+	6					±	•	112
TOBLET LIVE CONTROL	45.034	М	OPEN DR GUD	ИА	CPENSCONTROL	42	-	n	•0
מרקבן נייאג	41719	-1	+5 VDC		SVDC=1/GHO=0		-	80	49
TVST1 CASE	5:11	-	+5 VDC		5VDC=1/6ND=n		-	•	•
GI 183681 ****** IH	51015	-1	+5 VOC		5VDC=1/6kD=n			ಘ	ec.
TAMONT ACOUISITION	<1039	*	+5 VDC		5VDC=1/3ND=0			60	<b>c</b> 0
1532 P. 1532	23615	ю	6401415	NA	OPENERO SELF TST	NA	-	၈	æ
\$5FF 75ST	23053	ĸ	GROUND	AN	OPENANO SELF IST	NA	-	Ф	ø)
(117) 1228	AC136	7.0					16	€F.	128
240	90010	1.0					16	ю	128
	46034	6.					32	60	256
14- 1 (3,17)	80018	10					32	90	556
14. 2 (3JT.	89022	10					32	ø	556
1200 2 222	80037	10					96	æ	168
05× 1 (0,17)	92008	5.5					96	•0	768
114 Seradi (001)	90014	10					16	00	128
#F101+ 1 (0,T)	80063	m					-	10	40
47001 8 -1302A	96064	*1					-	60	æ
*F_CT - 3 (0_T)	23002	m					-	40	•
4F2C1 4 (3CT)	99008	*					-	•	•
*F_C1+ \$ (00T)	23067	m					-	•	•
11001 9 -1001	8000	P)					-	•	•
#6001 - 2 100th	69306	m					-	•	•
METCH - 13079	90070	м					-	•	•
1100) 6 -1114	A0071	m					-	•	•

о г	IPAYST PROCESSOR 2	055 730	<b>8</b>		OUTPUT				
SECOND WAYS	\$1619	TYPE	SIGIO TYPE VOLTAGE RANGE	PARAMFTER RANGE	SCALE FACTOR	RESOLUTION	OCAN NAVO	5 8	8/8
ME261-10 (32T)	8-30.72	×					-	•	•
MF(C1-11 (OUT)	8:038	**					•	•	•
WFUCI+12 (7,1)	93374	m					-	•	•
MF361-13 (3UT)	30015	•					-	•	•
PF203+14 (2017)	86075	m					-	•	•
*F3C1+15 (2UT)	3( 0 7 7	'n					*1	•	•
MF0C1-16 (201)	80073	m						•	•
*F201-17 (701)	60026	m					-	•	•
(100) 61-13/34	96080	~					-	•	•
(170) 61-13054	10006	m	-				-	•	€0
PF (1-2) (2-1)	90005	m					-	•	•
WF: C1+21 1301)	867583	m					-	•	•
PF101-22 (001)	49008	m	•				-	•	•
4F101-23 (301)	Sevie	m					-	•	•
130 -2-13-24 <b>241</b>	95058	ю					-	•	•
hFuct-25 (001)	A0087	m					-	•	•
CCA :	A0041	m					-	•	•
BELEA V. ITAL	47001	v					11	16	176
FOLICETIAGE St	53065	SO.	9 TO 25 VFC	4 2	NA	<b>v</b> n	::	16	176
225 785,307100	53087	ស	0 TO 25 VDC	NA	AN	<b>v</b> r	11	16	176
315 DEFLECTION	<b>5308A</b>	S.	0 TO 25 VAC	A N	N.	<b>s</b> n	11	16	176
135 DEF_ESTION	53089	ß	0 TO 25 VAF	· VZ	A A	<b>s</b> n	11	16	176
TRUE ATASPEED	27111	٧n		474		1 KNOT	11	32	352
BAFC"ETHIC ALT	27112	v	ر ۲۵ م ۷۵۷	118 KTS TO 600KT 12.75 FAIL/MV	12.75 FAIL/MV	25 FEET	::	32	352
ALCHOUTSUF	27113	v	0 10 4 400	1000 TO 50000 FT	0.19M/VOLT	+BB2M/10.5WV	::	32	3%5
812 96663	28082	'n	0 TO +2.2 VOC	0 TO -2.2 DES	1VDC/1DEG	¥ 5.0	11	32	352
פוניה.	26083	so.	0 TO +15 VIC	0 TO 599 KTS	150MV/7KTS	9.5 %	11	35	35.2
CATA NO (TRUESCOMP) 27093	27093	10	O GR S VAC	AN		Q Z	160	35	\$120

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PROCE SSOR
P. C.
1S.VCI
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		20001101	<b>u</b> 25						
111 y 47 - 14 - 15 - 14 O	V1918	TYPE	TYPE VOLTAGE RANGE	PARAMETER KANGE	SCALE FACTOR	RESOLUTION	OUAN	5.78	8/8
CATT AF 10 TRUESCOM	27094	10	OCH 5 VOC	A.*		NA	91	35	512
CATA WP 17 THUESCOM	2:035	31	0 OR 5 15c	NA		A A	92	32	515
CATO REY TACESCOMP	90665	16	ں 0€ 5 مں۔	N N		VA	16	32	512
dw00887el Ale Vavi	21537	1.0	061 S 60 0	٧٢.		NA.	16	32	215
新加工市场的公司 100mm	23057	*	00EN 08 +0.390 VDC	***	OPENSTE OK	ત ર		32	32
SET 44 65	56937	#	OPEN OR 2840C	tıA	OPTURNO RATOR	P,A	-	32	32
SET SALLS TEST	74038	,	DEC 38 38-DE	2.7	OPEGENO TEST	บส	••	32	32
AC TETEL PELIAGILIT	23629	Ħ	3 09 5 VAC		0.000 m (E.o.)	47	*	3.2	32
LI SPAINED FLITTURE	28285	ı,	C TO 25 V/C	0-5000 FT	144/7458	7 FEE?	11	32	352
DOMESTA CESSES IN	23032	'n	0 10 25 700	0-5000 FT	134/7FT	7 FEE1	11	32	352
10 14 14 15 15 15 16 16 16 16 16 16 16 16 16 16 16 16 16	75086	٠Ç	3 TC +25 V7C	9 TO 5.000 FT	35MV/7FEET	7 FEET	11	32	352
TITHWITE SETTIMENT	23066	-	3 TO 5 VOL		OVDC=OK	<b>4</b> 2		32	32
PLANTED ALTITUE	53760	'n	0 TO 25 VIC	0-5005 FT	3544/767	# (1) # (2) # (2) # (3) # (4)	11	32	352
3007114 CSS1019 14	23376	S	0 TO 25 VIC	0-5909 FT	357V/7FT	FEE.*	11	32	352
50464 UTA 4445	25050	5		+-10 PEG	150 UA/10 RFG	1/16 5139	11	3.2	352
1703	25918	o.		0/360 DEG	1056=1056	0.1 DEG RYS	*	32	8 \$
LOT 1.ST PELLATION	41025	9					11	32	352
LOC FLAS CUTPUT	41024	٥					11	32	352
CS THATA PENIATION	41027	٠					11	32	352
SS FLAG BUTPUT	41626	9					11	32	60 60 80
LOC DEVIATION	41929	•					:	32	352
SS DIVIATOR	+1030	٥					:	32	352
LOC FLAC DUPUT	41131	٠					::	32	352
GS FLAG SUIPUT	41032	•					11	32	352
COC DEPTATION	41033	٠					11	32	352
SS SEVIATION	41034	ı					11	32	352
100 T'ST DEVIATION	65014	æ					::	12	355
LOG FLEG SUTHUT	41755	9					::	32	345

8 2 0 1	TOAWST PROCESSOR 2	RUCESS	CP 2		OUTPUT				
SIGNAL NAWE	21915	7 Y F E	SIGIO TYFE VOLTAGE RANGE	PARAMETER RANGE	SCALE FACTOR	RESOLUTION	COAN	۲, ۳	6
SS PISTA DEVIATION	*1061	ø					11	32	35
CS FLIG DUTPUT	41962	ø					11	32	35
LOC STRINGS	4:067	\$					11	32	35
PCITATION SE	41069	و.					::	35	35
COUPLET STORAL	45032	•					11	32	35
Selfacie A. Tre	49642	ø٠	11.8 VAC	0 70 350 056	10E6/0E6	12 ARC MIN	1.	32	3
84012 (2.4.x) SCC HI."154	21043	٥,	0 TO 11.8 VAC				14	<b>3</b>	89
PITC .	25621	σ		+-90 PEG	1066=1066	0.1 DEG RMS	*	9	69
APAG 1 (3JT)	90005	10					16	3	102
(1fc) 8 55da	90004	10					16	64 102	102

	IMPUT SE RANGE SCALE FACTOR	SNOP & LADIA  1. CLTAGE RINGE PARAVETER RANGE SCALE FACTOR
6Nn=1/OPEN=1		
6ND=1/6PEN=1		
115 VAC UR NPER	₹ Z	
GROUND AUD NPER	<b>4</b> ?	
640=1/549C=n		₹ 0 TC 5 VDC
640=175VJ(=0	りいろ	
G40=1/5v0C=0		4 0 TO 5 VOC GND=1.
GND=375VDC=0	10 5 VPC GND=3	ଜୁ ସମୟ
0405115V0C=0	964	
6ND=1/5VDC=9	TO 5 V7C GND=	3c/ e
5VDC=50"/GNn=+	SVD	\$VD
\$VDC=++\$0/64D=+	מאס	10.712 10.712
640=175V0C=0		י +5 יחכ דו נירוכ הי
64N=1/5V0C=0	0 700	
	י אבר דר פ אסכ	4 +5 VCC TO 9 VOC
	S VOC TO 9 VOC	4 +5 VDC TC n VDC
	5 VIC TO N VOC	45 VEC 10 N VOC
	. VOC TO 1 VOC	4 +5 VOC TO 1 VOC
	5 VDC T3 n VnC	4 +5 VDC TO A VAC
	י אסכ זה א אטכ	4 +5 VOC TO N VOC
	פ אסכ בכ ב אסכ	4 45 500 70 7 700
	VOC TO C VDE	4 +5 VOC 17 0 VDC
	1 456 10 4 496	4 +5 VDC 10 A VDC
	VDC 10 0 VDC	+ +5 VDC 70 0 VDC
r=3645/1=649		+ +5 VPC 10 F VPC
GNP=1/5VDC=0		t > 10 5 VAG
5v0C=1/GN0=0		4 0 TO 5 VOL
	TO 5 VDC	* 0 TO 5 VAC

	8 K	~	~	~	22	•	•	10	•	•	•	•	•	•	•	•	•	•	€0	€0	•	•	•	•	•0	•	•	•	•
	۵/۶	~	~	~	~:	*	•0	•	•	n	æ	60	•	•	•	<b>10</b>	60	٠	•0	10	•	•	•	•	<b>6</b> 0	•	₹0	•	•
	DOAN	-	-	-	11	-	~	~	-	-	-	-	~	-	-	~	-	~	-	-	-	-	-4	-	-	-	<b>**</b>	-	-
	RESOLUTION																												
IMPUT	SCALE FACTOR	5V0C=1/6ND=0	5VDC=1/6MD=n																										
	PARAMETER RANSE																												
10R 3	SIGIC TYLE VOLTAGE RANGE	0 TO 5 VDC	n TO 5 VOC	26 VOC	+2.7 TO 5.1 VNC	+5 VUC																							
Poct SS	7.71.E	•	3	*	v	-	-	-	-	-	7	**	-		-	-	-	-	н	-	-	-	-	7	-	-	-		
THAMST PROCESSOR 3	21915	43137	43158	21137	43115	21119	A0027	A9031	80139	36139	64104	AC141	30142	90143	80144	96145	30146	40147	60148	80149	80150	A0151	50152	A0153	86154	90155	90156	AC157	A0153
0 1 9	Stolat lang	PPOX AP13 SEIF+52)	PROX PRNS SW(P.51)	EcsE LIGHT	ALT OFSET VOLTAGE	HAT GE CELAT	05- 1 :1 )	(11) 2 -37	(FI) I -2303x	PF. CZ- 2 (TN)	MF-C2+ 3 (7%)	#F] (2+ 4 (T1)	PF-C2- 5 (11)	"F.C?" 6 (I'4)	4E C2+ 7 (TV)	(C.1) 9 +25 da	MF7(2+ 9 (1%)	*F1C2-19 (113)	WFCC2-11 (1%)	VF_C2+12 (TS)	MF[C2-13 (17)	MF:(C2-14 (13)	MF102-15 (1%)	NEJC2-16 (TV)	#F702-17 (19)	PF:C2-18 (11)	PFCC2-19 (14)	*F. C2-20 CT. 1	*F.C2-21 (T*)

Stock teat   Sto			I HORESTONA I SENTI	なかいつと	0 10						
FFICE-PRINTING         A0159         1         4         8           FFCG-PRINTING         A0150         1         1         9           FONDING PRINTING         A0150         1         9         9           FONDING PRINTING         A0150 <th></th> <th>1,31, TV:115</th> <th>31612</th> <th>3742</th> <th>VOLTAGE RANGE</th> <th>PARAYETEP RANGE</th> <th>SCALE FACTOR</th> <th>KESOLUT194</th> <th>OUAN</th> <th>£ 5</th> <th>A/R</th>		1,31, TV:115	31612	3742	VOLTAGE RANGE	PARAYETEP RANGE	SCALE FACTOR	KESOLUT194	OUAN	£ 5	A/R
FPECE - S (T1)         SOUSS         1         4         4         4         4         4         4         4         4         4         4         5         4         5         7         8         7         8         7         8         9		VF1C2-23 (11)	A0139	~					-	60	•
FFCCE-24 (IL)         A0161         I         A0162           FFCCE-25 (IL)         4C152         I         I           3.30 3C ESIEL         7141         7         I           6.0127 401 (F)         24189         9         I           COILLOT SEAT         24219         9         I           COILLOT SEAT         40316         10         I           SCOILLOT SEAT         6031         10         I           SCOILLOT SEAT         10         I         I           SCOILLOT SEAT         I         I         I           SCOILLOT SEAT         I         I         I           SCOILLOT SEAT         I         I		(L1) 82-23/5m	80159	~					1	•	•
1 A CLEACH       3146       1       1       0         3-10 NC LEVEL       2141       7       11       0         13-10 NC LEVEL       2141       7       14       0         15-10 NC LEVEL       24149       9       14       0         15-10 NC LEVEL       24149       9       14       0         15-10 NC LEVEL       4001       10       14       0         15-10 NC LEVEL       10       0       0       14       0         15-10 NC LEVEL       10       0       0       14       0       0         15-10 NC LEVEL       10       0 </td <th></th> <td>MF(C2-24 (I%)</td> <td>A0151</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td>•</td> <td>€0</td>		MF(C2-24 (I%)	A0151	-					-	•	€0
13.10 SC EMET       214.1       7         CONTLOT AUT (F)       2414.9       9       14       8         CONTLOT AUT (F)       2421.9       9       14       8         CONTLOT AUT (F)       4015.7       10       14       8         CONTLOT AUT (F)       6003.5       10       16       9         New (F)       4001.9       10       16       9         New (F)       4001.9       10       10       32       8         New (F)       4002.8       10       10       32       8         New (F)       4002.8       10       10       10       96       8         New (F)       4000.8       10		(:I) £2+25.J.	36136						-	•	•
CONTINITY AND (F)       24149       9         CONTINITY STATE AND (STATE)       24219       9         CONTINITY STATE AND (STATE)       4016       10       14       6         SCATE (TY)       A016       10       16       9         NAME (TY)       A017       10       16       9         NAME (TY)       A018       10       16       9         NAME (TY)       A018       10       32       6         NAME (TY)       A019       10       10       10       10		3-30 00 -5456	21141	^					11	40	<b>©</b>
Collight 2241 at 2421 a		CONTENT AND UPA	69102	σ,					14	ø	112
SCCA (IN)         A0167         10         512         3         46         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         8         7         8         8         8         8         8         8         8         8         8         8         8         8         8         8         8         8         8         8         8         9         8         8         9         8         9         8         9         8         9         8         9         8         9         8         9         8         9         8         9         8         9         8         9         8         9         8         9         9         9         9         9         9         9         9         9         9         9         9         9         9         9         9         9         9		Costent and a	24219	ō,					<b>3</b> I	€0	112
CS (TS)     CODIT     10     16     8       New (TS)     CD03S     10     16     8       New (TS)     A019     10     32     8       New (TS)     A022     10     32     8       New (TS)     A022     10     96     8       New (TS)     A030     10     512     64     32       New (TS)     A030     10     512     64     33		SC (** (17.)	F9104	10					512	arı	9601
New, (15)         GEOBS         10         16         8           Int. 1 (13)         ADD19         10         32         8           Int. 2 (13)         ADD23         10         96         8           Int. 2 (13)         ADD15         10         96         8           ADD2 (14)         ADD2 (14)         ADD2 (14)         80         8         8		(3: 12:)	09911	10					16	•	128
14. 1 (11)         A0019         10         32         8           14. 2 (13)         A0023         10         32         8           14. 2 (13)         A0015         10         96         8           PDTS 1 (14)         A0007         10         512         64         32           PDTS 2 (14)         A0007         10         512         64         32		(52) 784	80035	1.0					16	€0	128
IMM STYRED (IQ)     ADDES     B       IMM STYRED (IQ)     ADDES     B       PAGE (IQ)     ADDES     B       PAGE (IQ)     ADDES     B       PAGE (IQ)     ADDES     B       STR     64 33		14. 1 :1:1	A0119	10					32	40	526
144 5 175 1 0     3515 1 0       312 64 35       313 64 35       314 5 5 7 1 0		INT S AINT	40023	10					32	40	256
Part 1     (14)     Acros 10     512     64       Part 5     (12)     Argo7     10     512     64	24	(MI) TIBARE FAI	A 5 9 1 5	10					96	90	168
A0307 10 512 64	16	(N) 1 0 da	30008	10					512	64	32758
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	PESOLUTION																		N A	NA	A N	NA	NA	A N	NA	A A	A N	N A	PJA.
OUTPUT	SCALE FACTOR																		OPEN OR 115 VAC	OPEN OR 115 VAC	115 VAC OR OPEN	25 VDC OR GND	GROUND OR OPEN	GROUND OR OPEN	GROUND OR OPEN	GROUND AND MPEN	GROUND AND OPEN	GROUND AND OPEN	GROUND AND OPEN
	PARAMETER RANGE																		V	A N	42	. AN	. AN	NA.	r.A	N.A	n a	W.	11A
0R 3	UNLTAGE RANGE									•			•					0 TO 5.5 VAC	115 VAC	115 VAC	115 VAC	25 VDC	GROUND	6800110	GROUND	ONOOUS	GROUND	GROUND	GROUND
SSEE	1765	*	•	#	÷	m	'n	'n	ю	ю	E	ю	ĸ	ю	m	'n	01	s	-	-	m	ю	ĸ	ю	ю	ю	m	ю	ю
COMMET PROCESSOR 3	01918	5005	400 g	4096	£00 ti	11501	15002	15013	15014	15015	15016	15017	15016	15019	15020	15051	26004	43111	53381	53082	53003	53004	53005	53006	53907	53041	53062	93064	53066
· · ·	17 80 TV 18 80 TV	E15115 1 L20P A	E 4007 1 2716F B	R HUET Z GLICKS	3 4007 8 3:15:3	STAFILIZES THIM	MASTER CAUTION (C)	פרכ וכו	ANTI-1CE (1)	בחבר נכי	OVERHERD BYRICE	ELECTATORL (C)	MATERIALIC (C)	CETTE ATSLE (C)	FECS (C)	CALTION RECALLIED	CHEGG CISP_ATIC)	ALTITUCE PERENCE	FUSF	150±	POLER LAND	ACTIVITY TEST	LAUFCH TEST	ACTIVITY (1401CATOR)	LAULCH(INDICATOR)	ACTUAL VILLE	ACTIVITY LAND	LAU.C" LAMP	1351 C+ 1381

	ei *	E mossibled isari	53300	¥ 405		OUTPUT				
	\$100 \$100 \$100 \$100 \$100 \$100 \$100 \$100	\$1610	T 75 E	UPLTAGE RANGE	along a designed block	SCALE FACTOR	RESOLUTION	DUAN	¥ ( )	• / 6
	9	62365	• )	07/00 to	¥1.	DEED AND SECOND	710	-	~	~
	1.	37613	₹)	6,70,70	4.	SROUND SKN OFEN	44 5		~	~
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	6.47 .00	F3058	3	0.4004.0	•	Made Onla Shares	V V		~	2
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	G	53879	'n	ปีเมอนุช	<b>5</b> 1,	hadov One budoves	4.7	-	~	~
	T C	53071	'n	2400h2	1, A	GROUNG SAC PEN	4		~	64
	CH # 7 LE 1 - 34	51073	٠,	ष्य	₫.;	SPER THE CLISE	e 2	-	~	~
	C : 5 - 4 - 4 - 4	53074	P)	3400kg	y.,	DWUTE GRAUMO	<b>4</b> :		~	۰
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24		53077	*)	GMOGNO	1.1	CPEN AND GRAUND	đ Y	-1	8	~
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	SEC . Din D.	21107	ю						<b>.</b>	•
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	o	S HUSESCESSON 3		<b>n</b> eg		OUTPUT				
	Stat Jan 18	\$1015 \$1015	7. 7.	SIGIO TIPE VOLTAGE RANGE	PARBMETER RAUCE	SCALE FACTO?	RESCLUTION	¥ 0	<b>X</b>	æ
	CIST T UNITS	4606A	s					Ξ	•	
	Dist # 1546	16063	ç					::	*	
	SCREH A 1813	46070	ς						*	
	1412) 8712 27	21035	,					11	*	
	400 HZ 4474ER BEACH	41017	м	GND/OPEN		GND=1/C^EN=r		-	•	
	1300 -2 #44 3EACJ1	41618	٠,	GND/OPEN		6ND=1 OPEN=0		-	•	
	3000 HZ MKR BEACON	41019	ĸ	SVDZOPEN		GND=1/OPEN=0			•	
	400 HZ HARKER PEACE	41078	M)	GNCZOPEN		GND=1/0PEN=1		~	•	
	13564Z P.44 PEACH	41079	۳	SHDZOPEN		6110=1/0PEN=0			•	
	SOCIAT MER PEACL	41090	€0	SADZOPEK		647=1/0PEN=0		-	•	
	40C HZ 434E4 BEACH	41094	٠,	61,070PEN		GND=1/OPEN=0		-	•	
	1300HZ MAR PEACH.	41085	*1	1,340/01/9		GND=1/OPEN=F		-	•	
249	3000HZ MKR BEACH	41096	٠	WEMO ZONE		GitD=1/00/LN=0		-	•	
•	SUBD IDENT	51023		→S VOC		9-01-3/1-30A\$			•	
	SUAS IDENT	51024	~	30A S+		0=0K9/T=j2AS		-	æ	
	HIGH-LOW THEAT ID	51025	-	36√ 5÷		5VDC=1/6MD=n		-	•0	
	TANTER ACTUINITION	51322	3	•\$ VCC		\$V0C=1/540=6		-	40	
	28,00 10 15	28189	,	CPEN OR 28 VOC	NA	OPENEDOT IF MODE	4 Z	-	49	
	13/FRGP (+F30M)	46073	'n			מפתות בנג שמנה		:	•	
	DEVIATION (+LEFT)	45074	٧n					11	•	
	10/6800(+13)	45075	s					11	•	
	CEVIATION CARIGATI	*6.76	•					11	•	
	A.A.V FLBS &	42398	Ð					::	•	
	54A7 FL35 4	4607A	d)					11	•	
	6,35+3	46°79	s					11	•	
	3**60	2405#	'n					11	€0	
	E=560	10095	s					11	•	
	¥ * 0.0	66080	'n					11	•	

	J .	1 005532666 154611	533cm			CUTPUT				
	**************************************		, ,	DLTAGE RAYGE	DROBACTOD FARE	SCALE FACTOR	RESOLUTION	CUAN	U./R	4/4
		40,086	J	36 VAC 40042				3.6	œ	118
	* * * * * * * * * * * * * * * * * * *	28343	σ.	24 14C 400+1Z				t m	70	11
	(100) 33	11154	<b>1</b> C					9:	æ	120
		93512	-1					16	10	126
	CAT LA TOP	90036	ĵį					32	Ф	256
	1,701 201	62.64	ä					32	0	52
		1 ( ) a						8	Ø)	256
	(1001)	M 2001	10					90	æ.	166
	(1.3) 5 73.	40.032	7.0					96	æ	76
	(100) 700 (3 74)	A:~16	7.					16	<b>4</b> 0	124
	HAIR COURTS 10011	S BOOD	•					-	ø	~
	Harm (CC11, 4, 2,0001)	8000	•					1	60	~
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50	CE LIFE KTATEL GIA .	9400'8	£					-	60	
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	450 C 2012 9 8 (0 1)	#30c + 1	*)					-	30	_
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	(10) 8 (1) 35 (1)	9365 F	*1					н	er.	_
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	MAIN CONTABINETO	60053	7					11	€0	ĩ
	PETER- 1 (3(1)	A0113	*n						•	_
	(170) 2-2)3,	AC116	ĸ					-	40	_
	FEC(2+ 3 (3UT)	AC115	'n					-	•	~
	MFEC2 4 (39T)	91.69	m					-	40	_
	(Ji(C) S -Z))ja	80117	m					-	•	_
	VFTC2- 6 (3UT)	80114	m					~	€0	_
	12.61-7.63.83	A0110	•					-	•	_

0 •. •0	IDAMST PRCCESSOR 3	CCESS	0 k 3		DUTPUT				
SISTAL NATE	S1613	TYFE	VOLTAGE RANGE	PARAMETER RANGE	SCALE FACTOR	RESCLUTION	OU AN	U/R	9/R
MFDC2- 8 (3UT)	80120	m					-	•	•
MOFC2- 9 (3UT)	80121	•					-4	•	60
MFDC2+10 (3UT)	90122	M)					-	60	•
#2F02+11 (20F)	80123	۴,					-1	60	æ
MDFC2-12 (CUT)	80124	m					-	•	•
MEDC2+13 (DUT)	80125	ĸ					-	60	•
41762-14 (201)	80126	ĸ					-	<b>s</b> 0	80
(150) 91-05 (34)	80127	m					•4	60	•
MFEC2-16 (3/T)	80128	٠					-	<b>4</b> 0	•
*F202-17 (20T)	£0129	m					-	•	60
AFE"2-18 (2:II)	80130	•					-	<b>6</b> 0	¢
*F1001-61-2011	80131	۲)	•				#	40	10
251 251	80132	ю					-	€	€0
F28(2+21 (2UT)	80133	m						•	•
MFGC2-22 (3UF)	80134	ю						<b>4</b> 0	<b>4</b> 0
AFUC2-73 (3UT)	80135	ю					•	æ	€0
MED(2+24 (3UT)	P.3136	m						40	•
FF-52-85 (3UE)	80137	м					-	40	•
CC 2 5	29004	м						æ	•
45 PEFLECTION	53095	'n	0 TO 25 VOC	V.V	NA	'n	11	16	176
225 CEFLECTION	53096	2	0 TO 25 VOC	NA	A Z	S	11	16	176
315 SEFLECTION	53097	'n	0 TO 25 VDC	AN	4 Z	6	11	16	176
135 CEFLECTION	53098	S	0 TO 25 VDC	Air	A Z	v	11	16	176
SCA' A	21132	m	0 400				<b>e</b> 4	16	9;
150-ECHO LEVEL	21126	'n					:	16	176
AZ STAR (ST4)	21093	^					#	16	176
AZ STA9 (C3S)	21094	1					=	16	176
ALTITUDE	21153	^					11	16	176

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2) 4) (3)	inavst proctssom 3	PO\$1.55	8 a3		DUTPUT				
2 on Tennis	81610	7 7 1	STATE TTHE VOLTAGE RANGE	FAPAMETER RANGE	SCALE FACTOR	RESOLUTION	BUAN	*/5	3/8
63 (1) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4	21134	7					11	15	176
(500*105) (78*10 24	21122	2.3					14	16	22#
Cases of a	26213	Ŋ	3 TO +2.2 VEC	0 10 -0.2 559	9351/3641	9.5 %	:	32	352
C	2 A 2 1 3	i.s	0 10 +112 10C	C TO 543 KTS	15074/74TS	٠ ۲	11	32	252
ALITERITE SA	20193	**	CPEW OR AC 356 VOC	4.4	CPEULTF OK	4.2	-	32	25
18 42 50 48 5 198	21:13	3	วับครับ 60 กรษย	a .	CANOVICE E NO OK	tt A		3.2	32
TF SELIABLITY	2614	ø	2 + 2 + 2 + 5 V VC	0 TO -2.2 DES	28V00 - FAGE 2V00/056	A 22	11	(V.	352
Majay Austruge	20163	s	2-A 48+ 01 6	0 TO 5.000 FT	*SMV/7FEET	7 FEET	11	32	352
NOTIFIAGO TOS	11063	٥					11	32	352
10111111 VO	4361h	2					11	32	352
CO FLAG SUPPLE	41065	9					11	32	352
15 8110 State of	+5UT+	a,					11	<b>2</b>	352
SILE BLITTLE CIPT	43:12	'n					:1	32	352
Man CBTICE BBC Code	14171	-	0 CR 5 VOC	11A	OPEN=HUO ON/OF	Z Z		32	32
C40* +140	22646	0	35A S eu 0	4.4	SVDC=HUD OF /F AIL	A A	128	32	4296
2 1 2 2 1 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1	18082	1	377 5 80 5	NA	N.A.	V ?	16	32	512
Canal Share	25224	3	2 GR 5 VTC	4 Z	4 A	NA	16	32	512
CESA WEADY	76225	ü *1	20 8 8 V 3 C	<b>V</b>	4 7	NA.	16	32	515
CATA SEADY	29256	e el	0 C4 5 VOC	<b>a</b> n	NA	na	16	32	512
CATA CLOSA	75257	0.4	3 0P 5 VOC	4.2	NA	42	92	32	5:5
בשבת כהושל	56229	7.0	0 OR 5 VCC	114	<b>4</b> 7	AM	16	33	512
45.6.1 (3JF)	90006	10					16	<b>3</b>	1024
40,0 2 0,0Th	90008	10					1.6	<b>\$</b>	64 1024

11   11   11   11   11   11   11   1		8/8	126	124	126	126	256	256	52	256	76	2.2	250	76.	191	196	7.5	12										č	ž	
110		6/0	•	•	•	•	10	•	•	•	•	60	70	**	•	•0	ю	æ	. TO	•	40	•	•	•	•	40	•	•	•	
10   10   10   10   10   10   10   10		BUAN	16	16	16	16	2	32	32	32	96	32	32	96	9	96	16	16					~	H	•	-		11		
Siglo   TYPE   VOLTAGE RAWTE   PARRATER   SCALE FAMILE   SIGLO   TYPE   VOLTAGE RAWTE   PARRATER   SCALE FAMILE   SIGLO   SOUTH   SO		RESOLUTION																												
### ### ### ### ### #### #### ########	TUGNI	SCALE FACTOR																												
		PARAMETER RANGE																												
	S AND DISPLATS	VOLTAGE RAWGE																												
	0v.TPOL	TAPE	16	10	10	10	13	10	10	10	16	<u>ن</u>	10	16	0	13	13	13	₩,	'n	m	•	m	m	6	•	ю	7	1	
	O TEMEGI	51617	40156	90163	90010	80012	80034	90036	90018	80922	80030	\$3050	95624	90,08	50033	AC032	40614	83016	M + 0 0 6	**506	24006	34508	80047	800th	8004	40050	8:051	80025	60053	
262	o <b>5</b>		SC 2 1 ( ) ( ) ( )	Scat. (90T)	55×U (001)	55 U (001)	(270)	(001)	1 40572	14 2 (0.)Th	DEK 2 four)	12501 1 70	(4. 2 (0.1)	DEX 1 (0.27)	120 1 (071)	127 2 (0.07)	144 SYABIL (601)	(44 SYMBOL COUT)	A D CO.T. 4 1100T)	(100) \$ (001) 5 F	14 C COUT_3 310UT)	iand douter weekti	HAID CONTER SCOUT)	JANO CORTLA 610UT)	-4.6 664747 7(001)	in planta erouth	ANTO COMES 9 (DOT)	(TUDIOTE LINGS S. E.	MATE CELT. 11100T1	

	8/8	256	1324	1024	1024	1024	•	•	•	•	60	•	<b>6</b> 0	•0	€0	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	8/S	•	÷	9	**	• •	æ	€	60	70	•	€)	•	ø	<b>40</b>	40	<b>4</b> 0	•	•	•	•	40	•	c	•	Ø	••	•	•
	NUDC	52	1,6	16	16	16	-	-			••	~	•	-		-			-		~		-	•	-	•1	-		1
	PESPLUTION																												
Liteta	SCALE FACTOR																												
	PAFA "FTER RANGE																												
1554ST CONTROLS AND DISPLAYS	VOLTAGE PANGE												•																
D.TROL		0	10	10	10	12	ю	ю	ю	m	m	ю	۲۹.	~)	m	м	₩,	ĸ	•	m	m	n	₩.	۳	ĸ	m	'n	•	m
12**ST C	Sigir Type	9.115	2000	90038	40000	833C M	#306 <b>3</b>	490.8	42059	83066	P.3067	89008	<b>69</b> 307	0.000	11308	P 3672	R0073	A0974	A 3075	9000	F0077	90£78	80018	8008	Acc61	90085	60063	****	£8000
0 × &	STOLAL RAWS	0117 FEC3328 (001)	46,000 (000)	AP26 1 1358)	1100 5 504.	(LTC) 2 2244	WENC1+ 1 (00T)	4 FORTH 2 (DOT)	MFGC2+ 3 (30f)	MEDC1 4 (DD1)	*F_271 - 5 - 1747)	(Jac) 9 +tScal	12021 - 7 (201)	(100) 8 -1103 x 254	1200 6 -102s	MF501-10 +591)	*F661-11 (307)	*FCC1-12 (3UT)	MF201-13 (DUD)	*FEC1-14 (301)	Perc1-15 (507)	weict-is coul	"FEC1-17 (30F)	MF231-16 (301)	mFFC1-19 (3UT)	PF101-20 (301)	#F(C1-21 (36E)	#Fr(1-22 (30T)	#FECT-23 (Juf)

	0 \$ 6	IDAMST CO	WIROL	IDAMST CONTROLS AND DISPLAYS		INPUT				
	2.84 Tensis	SIGID TYPE	1112	VOLTAGE PANGE	PARAMITER SANCE	SCALE FACTOR	A£ 50LU710N	DUAN	8/0	8
	MF5C1-24 (3UT)	8008	m					-	•	•
	PF0C1-25 (0UT)	80087	m						•	
	MFDC2- 1 (3UT)	80113	m					-	•	•
	FF.C2- 2 (3UT)	80114	m					#	•	•
	MFUC2+ 3 (00E)	80115	n					=	60	•
	MFCC2+ 4 (3UF)	80116	٣					-	60	•
	*F3G2- 5 (3UT)	40117	m					4	•	•
	MFCC2- 6 (3UT)	80118	n					<b>4</b>	•	-
	#F2C1+ 7 (3UT)	40119	м					-	•	-
	MF002- 8 (001)	80120	м					<b>~</b>	•0	_
	MOFC2- 9 (3UT)	90121	P)					-	•	-
	(100) 01-2014	Ap122	m					•	•	
25	MDFC2-11 (3UT)	80123	*)					-	40	-
5	MUFC2-12 (3UT)	80124	ю					-	40	-
	PFUC2-13 (3UT)	A0125	м					<b>~</b>	•	_
	PFF C2-14 (3UF)	90126	M					~	<b>40</b>	_
	*F; C2-15 (3UT)	80127	ю						€	_
	#F; 58-16 (397)	40128	ю					<b>"</b>	40	_
	HF. C2-17 (3UT)	80129	<b>m</b> }					-	40	-
	#FUC2-18 (2UT)	AG139	м		-			-	•	-
	MFUCS-19 (DUT)	80131	m		. •			<b>-</b>	40	_
	MFNC2-20 (3UT)	80132	ю					-	•	
	*F002-21 (00T)	80133	m					-	•	-
	*F152-22 (3UT)	A 9134	m					-	•	•
	AF 1,2-23 (3)(F)	90135	<b>₩</b> O					-	•	-
	MF: 52-24 (3UT)	80136	m					<b>#</b>	•	
	#FCC2-25 (3UT)	80137	<b>M</b>						•	•
	CCA 1	A0061	m						•	Ī

	SUAN UZR BZR	<b>8</b>
	ESOLUTION	
10 L81	PASSAMETER RAWAE SCALF FACTOR R	
	PASSANCTER RANGE	
8 5 0 TEATS CONTROLS AND DISPLATA	SISID TYPE VOLTAGE RANGE	-
O ISERGE	SISIO	2000
o 4.	STARAL MAME	•

960*	1096	128	128	126	128	256	256	•	256	256	•	•	•	768	768	256	•	•	•	•	•	•	€	•	•	•
•	•	•	•	60	€	••	•	8	60	€0	60	40	•	•	•	•	•	40	•	•	•.	•	•	•	•	•
512	512	16	16	16	16	32	32	-	32	3.5			•	96	96	32	-	-		-	-	-	-	-	-	
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30165	90167	80009	A0011	A0033	80035	80017	8002:	80027	61008	80023	80025	80059	80031	8.3013	80015	80169	80138	80139	69140	80141	80142	80143	80144	80145	90106	90147
Signal nets Scar (17)						145 1 (14)	14. 2. (14)	(A) I ×35	I'V I (IV)	I* 2 (14)	. (11)	DEK 2 (IV)	(11) 2 -30	I'V SYMEDE (IN)	(NI) TOWAR PUT	WISSIGN SCOR(IN)	PF902+ 1 (7b)	MF, C2- 2 (IR)	*FUE2- 3 (TA)	45][[2- 4 (IN)	FEC2- 5 (IV)	PFUC2- 6 (TW)	#F.,C2- 7 (TN)	MF262- 8 (TV)	MECC2- 9 (IN)	*FJC2-10 (1h)
	512 6	512 6 10	110 10 10 10	10 10 10 10 10 10	10 10 10 10 10 10 10 10	10 10 10 10 10 10 10 10 10 10	10 10 10 10 10 10 10 10 10 10	10 10 10 10 10 10 10 10 10 10 10 10 10 1	10 10 10 10 10 10 10 10 10 10	10 10 10 10 10 10 10 10 10 10	10 10 10 10 10 10 10 10 10 10	10 10 10 10 10 10 10 10 10 10	10 10 10 10 10 10 10 10 10 10	10 10 10 10 10 10 10 10 10 10	40165         10         912         6           40167         10         16         6           40009         10         16         6           40011         10         16         6           80017         10         16         6           6017         10         32         6           6017         10         32         6           6018         10         32         6           6019         10         32         6           6019         10         32         6           6019         10         32         6           6019         1         1         6           6019         1         1         6           6019         1         1         6           6019         1         1         6           6019         1         1         6           6019         1         1         6           6019         1         1         6           6019         1         1         6           6019         1         1         6         6           6019	90165       10       512       6         \$0167       10       16       6         \$0007       10       16       6         \$0017       10       16       6         \$0017       10       16       6         \$0017       10       16       6         \$0027       1       1       8         \$0028       1       1       8         \$0029       1       1       6         \$0029       1       1       6         \$0029       1       1       6         \$0029       1       1       6         \$0029       1       1       6         \$0029       1       1       6         \$0029       1       1       6         \$0029       1       1       6         \$0029       1       1       6         \$0029       1       1       6         \$0029       1       1       6         \$0029       1       1       6         \$0029       1       1       6         \$0029       1       1       6	90165         1C           90165         1C           90165         1C           90167         1D           90017         1C           90017         1C           90027         1           80027         1           80028         1D           90029         1           90029         1           80018         10           80018         10           80167         1           8017         1           8018         1           8018         1           8019         1           8019         1           8019         1           8019         1           8019         1           8019         1           8019         1           8019         1           8019         1           8019         1           8019         1           8019         1           8019         1           8019         1           8019         1           8019         2           8019 <t< td=""><td>90165       10         90165       10         800167       10         90017       10         80035       10         80017       10         80027       2         80028       1         80029       1         80029       1         80019       1         80019       1         80019       1         8019       1         8011       1         8011       1         8011       1         8011       1         8011       1         8011       1</td><td>90165         1C           90165         1C           \$0009         10           \$0009         10           \$0001         10           \$0005         10           \$0007         1C           \$0007         1           \$0007         1           \$0007         1           \$0008         1           \$0008         1           \$0008         1           \$0008         1           \$0008         1           \$0015         10           \$0015         10           \$015         1           \$015         1           \$015         1</td><td>90165         1C         912         6           80167         10         16         912         6           80003         10         16         9         91         91         91         91         91         91         91         90         91         91         90         &lt;</td><td>\$10.65 IC</td><td>\$10.65 IC</td><td>  90165   1C   10   10   10   10   10   10   10</td><td>40165         10           40167         10           40167         10           40011         10           40033         10           80035         10           80037         10           80037         10           80037         1           80038         10           80039         1           80039         1           80031         1           80031         1           80031         1           80136         10           80137         1           80138         1           80140         1           80141         1           80142         1           80143         1           80141         1           80142         1           80142         1           80142         1           80144         1</td><td>90165 10  40167 10  40167 10  40069 10  40001 10  40001 10  40002</td><td>90165         10           60069         10           60011         10           60012         10           60013         10           60014         10           80025         1           80026         1           80027         1           80028         1           80029         1           80029         1           8016         0           8017         1           8018         1<!--</td--></td></t<>	90165       10         90165       10         800167       10         90017       10         80035       10         80017       10         80027       2         80028       1         80029       1         80029       1         80019       1         80019       1         80019       1         8019       1         8011       1         8011       1         8011       1         8011       1         8011       1         8011       1	90165         1C           90165         1C           \$0009         10           \$0009         10           \$0001         10           \$0005         10           \$0007         1C           \$0007         1           \$0007         1           \$0007         1           \$0008         1           \$0008         1           \$0008         1           \$0008         1           \$0008         1           \$0015         10           \$0015         10           \$015         1           \$015         1           \$015         1	90165         1C         912         6           80167         10         16         912         6           80003         10         16         9         91         91         91         91         91         91         91         90         91         91         90         <	\$10.65 IC	\$10.65 IC	90165   1C   10   10   10   10   10   10   10	40165         10           40167         10           40167         10           40011         10           40033         10           80035         10           80037         10           80037         10           80037         1           80038         10           80039         1           80039         1           80031         1           80031         1           80031         1           80136         10           80137         1           80138         1           80140         1           80141         1           80142         1           80143         1           80141         1           80142         1           80142         1           80142         1           80144         1	90165 10  40167 10  40167 10  40069 10  40001 10  40001 10  40002	90165         10           60069         10           60011         10           60012         10           60013         10           60014         10           80025         1           80026         1           80027         1           80028         1           80029         1           80029         1           8016         0           8017         1           8018         1 </td

e:	ICAMST C	ICAMST CO THOLS AND DISPLATS		OUTPUT				
is an invitage	STATE	THE VOLTAGE RANGE	PARAMETER PAULE	SCALE FACTOR	RESOLUTION	NACIO	R/2	B/R
250C2-12 (IN)	H014					*1	•	•
88052-12 (IN)	65159	1				-	qt	<b>6</b> 0
15757-14 (IN)	80151	••				-	•	≪
MEUCE-15 (IV)	5.178	**					40	Ø
#FDL2-15 (14.)	H0153	r-4				1	40	۰
1.1) LE-2002	46108					-4	40	e.
* F7C2-13 (f7)	01135	1					€0	æ
FE102-13 (11)	80156	-1				1	ø	60
450C8+80 (14)	46157						*0	€0
MEDC2-21 (IM)	50158						•	40
PF3C2-22 (IN)	80159					-4	•	•
(N) (2-5) (4)	69169	r.				1	•	စ
WE C2+54 (IN)	80161	1				-	•	•
Meics-25 (10)	30162						•	•
UITS RECORDER IN	80171	10				512	•	960+
*P36 1 (IV)	86001	10				1512	99	32.768
(AI) I block	30005	1.				512	\$	32768
92.6.2 (I.1)	A0003	0.7				512	94	32768
MP36 2 (14)	26000	10				215	2	32768
*F2C1- 1 (1R)	86038	1				-	<b>6</b> 0	€0
PFDC1- 2 (11)	80089	1				-	ø\$	€0
MFDC1- 3 (1N)	06006	1					•	•
WFCC1- 4 (IN)	16008						•	10
PF0C1- 5 (IN)	80092	1				-		•
FFECT - 6 (IN)	80093	-				-	•	•
*FDC1- 7 (IN)	9000k					-	•	•
MF301- 6 (14)	\$6006	1				-	•	•
MFEC1- 9 (IN)	A0096	-				~	•	•

ICHUST CO	IDAMST CONTROLS AND DISPLAYS		001701				
	SIGIO TYPE VOLTAGE RANGE	PARAMETER RANGE	SCALE FACTOR	RESOLUTION	DOAN	N/2	8/R
	1				-	•	•
					-	•	•
	1				-	•	•
					-	80	40
					-	€0	•
	Fl				-	•	€
	1				-	•	€0
	Ħ				#	60	•
	e				-1	60	€0
					-	•	40
	1	. •			-	€0	•
	-				-	60	€0
	1				-	•	•
	7				-	•	€0
	7				-	•	•
		-			#	₩	€0